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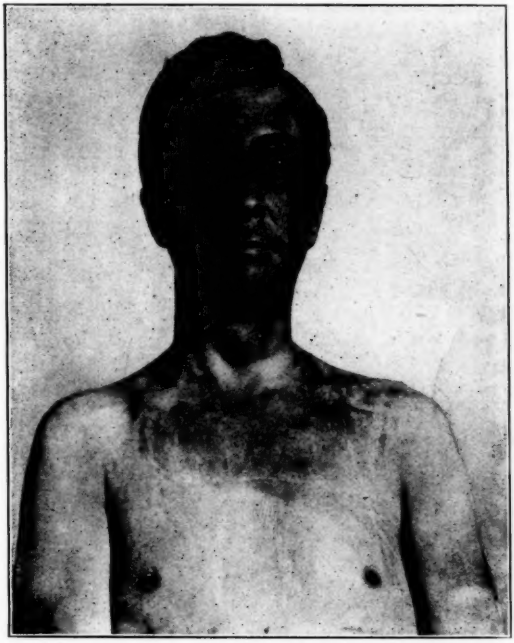

Photograph of the Patient Four Days Following the Injury.

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SECTION OF TUMOR NO. 1.

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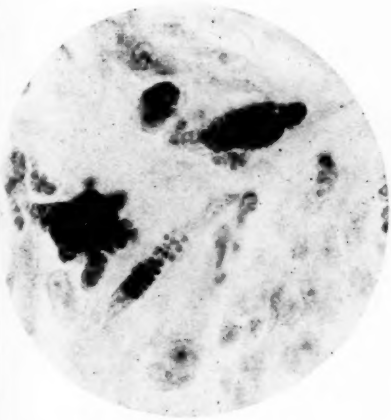

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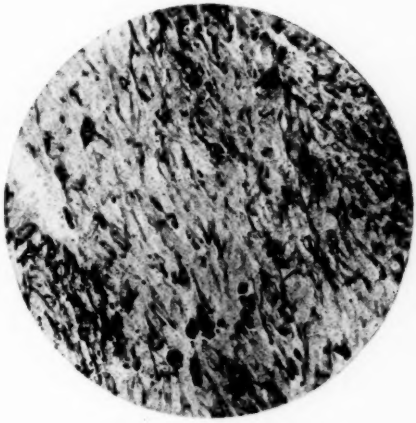

SECTION OF TUMOR NO. 2.

Showing predominance of cellular element and abundance of pigment.

ARCHIVES OF OPHTHALMOLOGY.

THE OPHTHALMOLOGICAL FINDINGS IN TRAUMATIC ASPHYXIA WITH THE REPORT OF A CASE.

BY DR. PAUL D. BERRISFORD, ST. PAUL, MINN.

(With one illustration on Text-Plate XXIII.)

THE appearance of pathological ocular phenomena as the result of traumatic injury received in other parts of the body is an extreme rarity. However, in traumatic asphyxia or traumatic apnœa as it is sometimes called, infrequent as is its occurrence, almost invariably presents externally an ophthalmological picture at once striking and characteristic.

CASE REPORT.—Mr. H. A., age 47, while demonstrating a two-ton tunneling machine, became pinned under it through accident. Although eight minutes elapsed before his release he retained consciousness throughout. A little later he passed into a stuporous condition in which he remained for four hours.

Upon admission to the hospital the clinical appearance of the case was as follows: the entire face, neck and upper part of the chest was of a slate-blue color as well as the external surfaces of the upper limbs. Where the collar band and elastic sleeveholders exerted pressure upon the skin surface, the integument appeared normal in color and in sharp contrast to the adjacent pigmented field. There was marked distention of the veins of the neck and face together with a puffiness that particularly involved the eyelids. The eyes were proptosed, the bulbar conjunctivæ protruding between the palpebral fissures as the result of subconjunctival suggil-

lations. Where the lids stood in contact with the bulbar conjunctiva, the latter exhibited congestion but without hemorrhage. The pupils were widely dilated and unresponsive to light. There were submucous petechiæ marking both sides of the nasal septum, the soft palate, and the tympanic membranes of the ears. There was also present a sublingual suggillation and a hemorrhage occupying the position of the frenulum epiglottidis. A fracture of the second, third, and fourth ribs of the left thorax was demonstrable.

An ophthalmoscopic examination made on the fourth day following the accident revealed the fact that in either eye there was a dilatation and increased tortuosity of the retinal veins together with a slight blurring of the disk margins, particularly the nasal halves. The left fundus showed two discrete, bluish-gray, elevated patches approximating the superior temporal quadrant of the disk. The right fundus contained similar spots scattered about in the retinal area between the optic nerve head and the macula but not involving the latter. Some distance from the disk an elevated exudative area ensheathed the inferior temporal vein. Despite the most searching examinations no retinal hemorrhages could be detected.

The earliest description of this condition was recorded by Olliver d'Angers in 1837 (cited by (1) Tardieu, (2) Wienecke, and (3) Milner), his observations being based upon a clinical examination of 23 persons who were crushed in a crowd at the Champ de Mars. Since that time there have been recorded innumerable cases of like nature resulting from panic through fire alarm *e.g.* Hospital du Bon-secour, Paris, 1848 (4) (Tardieu); Pon de la Concorde, Paris, 1866 (4) (Tardieu); Vienna Ring Theater, 1881 (5) (Burrell and Crandon); Victoria Hall, Sunderland, England, 1883 (6) (Waterson); Charity Bazaar, Paris, 1897.

The most striking clinical finding in traumatic asphyxia is the color of the face and neck and occasionally the upper part of the chest. This discoloration is described by various authors as bluish, bluish-gray, deep purple, etc., depending upon the degree of the injury and the duration of the cutaneous change. When examined minutely the skin is seen to be mottled with tiny areas of normal white color surrounded by a poorly defined bluish border, these borders uniting to form a mesh-work (5) (Burrell and Crandon). In view of the conclusions drawn

from animal experimentation, anatomical research and histological study it can be assumed that the true cause for the cutaneous discoloration in this condition is a venous stasis brought about through over-distention of the veins and capillaries. The dilated capillaries contain deoxygenated blood without its extravasation excepting in mucous surfaces.

OPHTHALMOLOGICAL CONSIDERATIONS.

Particularly noteworthy are the ocular manifestations and visual phenomena that have been observed in traumatic asphyxia, *e.g.* subconjunctival hemorrhages, proptosis, intrinsic muscular derangements, vitreous, retinal and optic nerve changes, etc. Assuming that in this condition the discoloration of the skin is to be explained by intense venous engorgement with capillary stasis, are we to expect the ocular findings attributable to a like cause? A review of the venous circulation of the orbit is not out of place at this juncture.

The ophthalmic veins are two in number, relatively large in size, markedly flexuous in course and with their numerous branches form plexiform communications. The superior ophthalmic vein commences anteriorly with the nasofrontal vein and at the root of the nose anastomoses with the angular vein. In its course it receives the anterior and posterior ethmoidal veins, the muscular, vorticose and posterior ciliary veins and near its termination the central retinal vein although the latter may open directly into the cavernous sinus (7) (Sobotta-McMurrich). The course of the inferior ophthalmic vein is inconstant, arising from the veins of the lower lid and of the lacrimal sac and terminating in two branches; one passes through the spheno-maxillary fissure to the ptergoid plexus, the other joins the superior ophthalmic vein emptying with it into the cavernous sinus. Occasionally the inferior ophthalmic vein opens into the cavernous sinus independently. Although (8) Parsons contends that there is a complete absence of valves in the veins of the orbit (9) Rauber maintains that only the inferior ophthalmic vein is valve-containing and this venous channel is smaller and relatively less important as compared to the superior ophthalmic vein.

Thus it is that the cavernous sinus, the pterygoid plexus and

the veins of the face are in intimate relationship with the orbital venous flow. In fact there is good reason to believe that in the stooping position the orbital venous flow is returned via the angular and facial veins whilst in the upright and the supine postures it escapes through the cavernous and pterygoid avenues. It is, therefore, reasonable to suppose that in traumatic asphyxia, there is, during the period of thoracic or abdominal compression, a tremendous and sustained venous engorgement of the veins of the orbit, bombarded, as it were, by the hydraulic pressure from the venous flow in the cavernous sinus, the pterygoid plexus and the angular and facial veins.

The appearance of proptosis in this condition, as in the reported case, must be explained by the occurrence of one or more of the following pathological entities, orbital congestion, œdema, or hemorrhage. That orbital venous stasis plays a rôle in its production has been referred to and an accompanying œdema of the cellular tissue may be supposed, for, reasoning by analogy, the puffiness of the skin of the face and eyelids in the reported case suggested subcutaneous serous extravasation together with venous engorgement. However, orbital hemorrhage more especially hemorrhage into the optic nerve sheaths cannot be positively excluded as a causative factor. Nevertheless, in orbital hemorrhage whether traumatic or non-traumatic in origin *e.g.* fracture of the skull, hemophilia, scurvy, increased blood-pressure due to coughing, sneezing, etc., the blood once liberated finds the path of least resistance and eventually appears under the conjunctiva and the skin of the lids. In traumatic asphyxia there has yet to be recorded a case exhibiting hemorrhage of the lids substantiated by histological examination.

In our case the appearance of hemorrhage beneath the bulbar conjunctiva, confined as it was to that portion of the globe which is exposed when the lids are agap is conclusive evidence that the blood did not originate from the retrobulbar tissue. The probable explanation for this phenomena rests upon the fact that at the moment of injury the conjunctival veins and capillaries are forcibly distended those within the field of the palpebral fissure suffering the greatest lacking as they do the counter pressure from the lids.

There remains to be considered the effect of orbital venous

stasis upon the globe itself. It has been ascertained that increased intraocular pressure may arise either from increased arterial or venous pressure. "The latter probably occurs in specific cases, being caused either by increased general venous pressure or by a mechanical constriction of local vessels" (8) (Parsons). As (10) Adamuk, (11) Graser and (12) v. Schalten have shown, there is a slight but inconstant increase of intraocular pressure when the external and internal jugular veins are tied. Further, (10) Adamuk and (13) Leber working independently have shown that when the venæ verticosæ are ligated there is a marked rise of intraocular pressure. In the opinion of the author, the free anastomosis of the orbital veins and the thinness of their valve-free walls permits ready accommodation for the abnormal quantity of venous blood, which, in this condition they must receive; and with this thought in mind the likelihood of an increased intraocular pressure is slight.

The pupillary changes in traumatic asphyxia are found to be variable. In the reported case and in that recorded by (14) Morian and by (15) Braun the pupils were dilated and fixed, in (17) Lange's first case, slightly dilated but reacted to light and convergence. (5) Burrell and Crandon report a case in which the pupils were small and did not react to light while (16) Beach and Cobb and Lange (second case) noted the pupils equal and equally responsive to light and accommodation. As one might expect the appearance of these pupillary phenomena is transitory.

In Lange's first case the failure of the pupils to respond to light he explains as the consequence of an injury to the oculomotorius resulting from a venous congestion or an existing œdema of the retrobulbar tissue. That a pupillary paresis may obtain he refers to a partial paralysis of the oculomotor nerve which supplies the pupil.

Interesting is the fact that in traumatic asphyxia only the portion of the oculomotorius supplying the intrinsic ocular musculature is affected. An attempted accurate description of the site of the lesion and its underlying pathological foundation giving rise to the aforenamed pupillary disturbances is obviously futile when we consider our scanty knowledge concerning the retrobulbar and finer intracranial changes in this

disease. However, in the opinion of the author the lesion does not lie within the orbit and for the following reasons: 1st the pupillary disturbances when present are bilateral and equal; 2d despite the frequently reported sign, proptosis attesting fairly extensive retrobulbar changes, only those derivatives of the oculomotorius supplying the ciliary muscle and the sphincter iridis are affected notwithstanding the close anatomical proximity of the other ocular nerves in the relatively confined orbital apex. The intrinsic muscular derangements, exclusive of those directly traceable to amaurosis resulting from optic nerve involvement, in the author's opinion may be postulated as eventuating from venous congestion or œdema implicating either the third nerve or dilator nuclei (18) (Starling) situated in close proximity beneath the aqueduct of Sylvius on the floor of the fourth ventricle, or an interference with their reciprocal innervation through affection of a portion of the sensorimotor area of the brain. The affection of the above named areas through hemorrhage and its resultant cerebral softening may be excluded as a possible pathological factor because of the transitory nature of the pupillary phenomena. (15) Von Braun, (19) von Recklinghausen, (3) Milner, (20) Ruppauner, (21) Schultze and (17) Lange have been unable to discover the smallest intracranial hemorrhage upon post-mortem examination.

Concerning intrabulbar lesions, their description and frequency, much is wanting for only occasionally has an ophthalmoscopic examination been made. In two cases reported by Beal (22) (Parker) the fundus picture was one simulating embolism of the central artery, that is, retinal œdema, thin arteries, dilated and tortuous veins and retinal hemorrhages. (5) Burrell and Crandon report a case in which small retinal hemorrhages were demonstrable. (2) Wienecke cites a case in which there were found two small hemorrhages peripherally situated, consequently leaving the central vision unimpaired.

(23) Rönne reports an interesting case. The second day following the injury the fundi were normal. On the following day the patient complained of haziness before the left eye with marked diminution of vision. Five days after the injury, although the ophthalmoscopic examination showed the retinal arteries and veins to be normal in appearance, there was a

complete amaurosis, a total abolition of pupillary activity. In the fellow eye there was a hemorrhage to be seen at the temporal edge of the papilla, a finding not to be observed on the two previous examinations. The amaurosis of the left eye remained complete.

Ramsey upon examining a case that came under the observation of (24) Sir George Beaton found that a double temporal atrophy of the disks existed with a loss of vision that later proved progressive. The visual fields were contracted.

In Moeser's case (22) (Parker) there was a partial atrophy of the optic nerve.

(17) Lange reports a case in which a slight swelling of the macular region obtained, œdema, without further evidence of retinal involvement.

However, to (25) Neck must be given the credit as the first to discover fundus changes in traumatic asphyxia. In the case recorded by him he noted small capillary hemorrhages in the macula and with them vitreous hemorrhage. After two months there was a transformation of the macular hemorrhages into a whitish area with a corresponding central scotoma and a vision reduced to four twelfths. The vitreous hemorrhage had become replaced by a web-like organized mass with attachment to the retina (retinitis proliferans).

Together with the pathological entities cited in the above cases certain subjective ocular phenomena may attend the condition. During the period of respiratory embarrassment if the patient retain consciousness, or as a precursor to the loss of consciousness the patient may experience complete visual obscuration: "I was unable to distinguish between light and dark"; "All became black around me," (the reported case); "All became black" (15) (Braun).

An attempted explanation for these varying ophthalmological changes must of necessity be speculative. In all probability they are but the expression of gradations of a distinct clinical entity traceable to a common cause. This may be referred to a retrobulbar hemorrhage exerting pressure upon the optic nerve and its contained blood vessels or an elevation of intraocular pressure through retardation or arrestment of the efferent lymph flow coursing through the canalis hyaloideus, the perivascular lymph sheaths of the central retinal vessels and the

intravaginal lymph space. As the work of (26) Marckwort and (27) Ulrich has shown the arrestment of the efferent lymph flow through the above named channels has no effect upon intraocular pressure. This was demonstrated by tying a ligature about the optic nerve. In the opinion of the author, a hemorrhage into the optic nerve or vaginal space can produce any of the aforenamed ophthalmoscopical pictures and may be explained on an anatomical basis peculiar to the region.

In the intracanalicular portion of the optic nerve the sheaths are closely adherent to one another, the dura to the bone, the pia to the nerve. The vena centralis posterior (28) (Kuhnt) collects the blood from the orbital part and opens directly into the cavernous sinus (29) (Vossius). The distribution of the venous passages in the orbital part of the optic nerve and sheaths may be considered as consisting of four systems, coursing parallel to the axis of the optic nerve and which through anastomotic branches stand in anatomical association. They are (1) vena centralis anterior; (2) the veins of the pia; (3) the arachnoid; (4) and the dura. The vena centralis anterior at the optic nerve head usually sends branches which intercommunicate with the choroidal venous plexus and along the course to its exit gives off venous twigs which traverse the optic nerve septa. The vena centralis anterior usually opens directly into the cavernous sinus. Although the veins of the pial sheath collect blood from the optic nerve septa their chief tributaries are the intermediate branches from the dura which bridge the vaginal space. That the vena centralis posterior opens directly into the cavernous sinus and usually the vena centralis anterior as well, are facts which, to the writer, are of anatomical import in an attempted explanation for hemorrhages into the optic nerve and vaginal space in traumatic asphyxia.

In this condition there arises at the moment of injury an increased venous pressure within the veins encased by the skull. These valveless channels, confined as it were within a ridged box of fixed volume, do not permit of expansion. Consequently, to assume that considerable back-pressure may be transmitted to the blood column of the vena centralis posterior irom the cavernous sinus into which it empties is not illogical fn cognizance of the fact that the latter is uninfluenced by the counter-pressure maintained by the skull. Having in mind

the fact that there exists a free anastomosis of the veins of the dural sheath with the widely distributed and readily distensible ophthalmic veins hemorrhage into the vaginal space from this source is hardly to be expected. The author, therefore, ventures the opinion that in traumatic asphyxia where hemorrhage into the optic nerve or vaginal space obtains its site of origin is either the vena centralis posterior, the vena centralis anterior or their ramifications. The detrimental effect resulting therefrom finds expression in a temporary inhibition of the function of the optic nerve or, in more severe cases, a permanent partial or total loss of vision through degeneration of the optic nerve fibers. Whether the diminution of vision be prolonged or permanent depends mainly upon the duration and degree of pressure exerted by the hematoma.

In the main, transient disturbances of vision are to be ascribed to another cause, an intraocular venous stasis implicating the retina and the choroid and of short duration. To repeat, the veins of the optic nerves and sheaths anastomose freely with the choroidal venous plexus. The external nuclear layer and the layer of rods and cones depend for their blood supply upon the choriocapillaris. With this in mind, it becomes manifest that a sudden rise of venous pressure within the veins of the optic nerve and sheaths will be transmitted to the choroidal venous plexus. The venous stasis within the choroidal venules thus produced, gives rise to transitory visual phenomena through œdematous affection of the rod and cone layer.

Before concluding the monograph there has yet to be considered a possible explanation for the temporary amaurosis and the ophthalmoscopic findings in the reported case. During the first forty-eight hours following the accident light perception was completely lost, gradually returning after that time until on the fifth day fingers could be counted at six feet. A visual test made six weeks later showed normal vision in either eye as well as normal fields for both form and color. That the lesion was one of hematoma involving the optic nerve or sheaths seems probable in view of the presence of dilated and tortuous retinal veins and a visual impairment out of all proportion to the ophthalmoscopic findings.

Of particular interest were the discrete, bluish-gray, elevated

patches that marked the retinæ. At first glance they assumed the appearance of isolated medullated nerve fiber areas. Closer inspection proved them to be slightly elevated with discrete and rounded borders. Their superficial position was evinced by the fact that in the right eye an elevated spot ensheathed the inferior temporal vein. An ophthalmoscopic examination made eight weeks after the accident showed that a gradual absorption of these areas in the right eye was taking place while in the left eye there was no evidence of their former presence. An examination was again made nine months after the accident and there remained not the slightest trace of the pre-existing fundus changes. These bluish-gray patches were no doubt œdematous swellings involving chiefly the nerve fiber layer of the retina, a supposition emphasized by their superficial appearance and their ability to undergo complete absorption.

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BRIEF NOTES ON SOME OPHTHALMOLOGICAL CONDITIONS.[1]

By Col. HENRY SMITH, I.M.S., London, England.

CONGENITAL CATARACT AND MICROPHTHALMOS.

CONGENITAL cataract in my observation is generally hereditary; I have frequently seen a number of members of the same family suffering from it and have generally been able to get a history of heredity. Like malformations in general you are not safe in assuming that the patient has no other congenital weakness. It is frequently associated with microphthalmos. I have seen three such cases in one morning. Microphthalmos varies in the degree of dwarfness of the eye; marked cases have always got an inferior congenital coloboma. I have seen a case of congenital cataract which shortly after needling became the subject of frequently recurring petit mal, which no drugs would control. We are thus not always safe in giving a favorable prognosis in such cases. With regard to the removal of cataract in adult subjects of microphthalmos you are very liable to assume that the lens is small in proportion to the size of the cornea. I advise you to beware of this temptation. In fact they are generally large and out of proportion to the size of the cornea.

We must operate on these cases for cataract and by this means can generally improve vision, though seldom do we get vision anything up to the degree that we are able to get in normal eyes. If the lens is soft we should needle or extract by capsulotomy.

In microphthalmic cases which have reached middle life, it

[1] Presented before Section on Ophthalmology, New York Academy of Medicine, May, 1921.

is as easy to extract in capsule as in any other case provided the incision is large enough.

DRAWN-UP PUPIL FOLLOWING CATARACT OPERATIONS.

The issue I wish to put before you in this connection is that whenever you make your incision for iridectomy you *always* make your iridectomy up to or beyond that incision. I have never been able to do otherwise. When the cornea is clear we do not want an iridectomy up to an interior sclerocorneal incision; such is unsightly and not so good for visual purposes as a more central pupil.

What I do as the result of experience in such cases is to make my incision in the cornea just where I want the lower edge of the pupil to be. Through this wound I seize the edge of the drawn-up pupil, draw it out, and snip off a small piece. If we make the incision in the cornea oblique, the scar will be big in proportion to the obliquity of the incision. We should make it at right angles to the surface of the cornea, in which case the scar will be linear and so small that it is only noticeable to the trained observer. In any case it is at the lower edge of the pupil and is thus out of the line of vision. It is astonishing how central we can make an artificial pupil in this way. I am not aware that this procedure has been put forward before.

CONTROL OF THE EYELIDS IN CATARACT OPERATIONS.

A great deal of our trouble in cataract operations is due to the pressure which contractions of the orbicularis put on the eyeball. In the simple operation for cataract, prolapse of iris is, in my opinion, due to pressure from this cause, not only immediately after the operation but for six or seven days after operation. To complete an operation with the speculum in situ is to give the patient an extra point d'appui for the application of such pressure. I have long advocated that the assistant should draw down the lower lid by the application of the surface of his thumb to the face close to it and with the third, fourth, and fifth fingers of his other hand to press back the brow while with the thumb and index finger of the same hand he lifts forward at right angles to the vertical line of the

head the upper eyelid on a large strabismus hook. This applies to the actual extraction of the lens and the subsequent toilet. While making the incision the upper eyelid can be drawn back with any retractor—it can also be done with a speculum, if the assistant holds back the eyebrow and the operator is careful. By the first means above outlined we can almost always control the patient's power of applying pressure. The management of the upper lid as here indicated may be found difficult. It is simplified by a separate assistant taking charge of the brow. The control of the brow is a very essential part of this procedure; the anatomy of the orbicularis muscle itself indicates to you this fact.

I want some of the younger members of the profession to find a drug, which when injected into the neighborhood of the orbit will paralyze the orbicularis muscle, for a period of six or seven days and which will do this with certainty. Such would enormously facilitate cataract operation and would in my opinion practically render it no longer necessary to do an iridectomy in cataract extraction. I have tried novocain for this purpose. Its action is only of short duration. I found it so erratic and uncertain that it was useless. Quinine urea hydrochloride I tried in the strength of one in six hundred after reading Crile's anocei association. It was useless. I gradually increased its strength to 6 in 100, at which strength with this irritant I was inducing œdema of the area, but did not succeed in getting any paralysis. It was merely an irritant and had none of the paralyzing power claimed for it by Crile. I tried to strike the ophthalmic division of the 7th nerve where it crosses the lower jaw with a hypodermic needle using novocain. I had done a number of dissections on the post-mortem so as to be perfectly familiar with its locality. Out of many attempts I only succeeded once (estimating success by results). The result in that case was ideal for the short time it lasted. By such failures we learn what we cannot do. We want some means of accomplishing these ends with uniformity, with certainity, and with ease.

We know that any irritant injected into the trunk of a motor nerve will paralyze it. We know that the duration of the paralysis depends on the strength of the irritant. Quinine urea hydrochloride is such an irritant, rectified spirit is another.

We know that pure rectified spirit injected thus will paralyze a motor nerve for months.

I would like some of the younger members of the profession to expose the sciatic nerve of guinea pigs or rabbits and to inject it with varying percentages of rectified spirit and find out what strength would paralyze it for a period of seven days. I think it would be found that from 5 to 10% would be sufficient.

If we then novocainize the area where the ophthalmic division of the 7th nerve crosses the lower jaw and cut down on it and inject it with this solution and stitch up we would accomplish an object. To do so would not be painful to the patient nor would the scar be unsightly. To find the nerve when we cut down might not be just so easy; a pole of a very weak battery would assist us in finding it. I am quite prepared to hear a howl at this suggestion, but if it came off and were as satisfactory as I anticipate the howl would cease.

REPORT OF A SECOND HUNDRED SUCCESSIVE EXTRACTIONS OF CATARACT IN THE CAPSULE AFTER PRELIMINARY SUBLUXATION WITH THE CAPSULE FORCEPS.

By Dr. ARNOLD KNAPP, New York.

THE technique in this series has not changed from that described in my previous article (these ARCHIVES, vol. xliv., 1915). The incision is scleral with a conjunctival flap. After iridectomy the Kalt forceps is applied as low down as possible at the lower pupillary margin, the blades are opened wide under the iris and a large knuckle of capsule is grasped carefully, firm enough to hold and not too tight lest the capsule be torn. After a varying degree of manipulation, the cataract in its capsule, if subluxated, is seen to press forward the iris below and its lower margin appears and remains in the pupillary space below; the forceps are then released. The incision is then enlarged with the scissors if a large enough opening to permit easy egress of the lens in its capsule is not assured. The technique is then that suggested by Col. Smith in his "tumbling" maneuver. The cataract finally is extracted, adherent at its upper extremity where the suspensory ligament still holds. With the concavity of the Smith hook under the cataract drawing upward, this final adhesion is severed and the lens is completely delivered.

This method is of course only applicable in suitable cataracts and in tractable patients. The detail of these cases and the summary follow:

No.	*Age.*	*Cataract.*	*Vitreous or Complications.*	*Healing.*	*Final Result.*
1	59	M		Hyphema	20/40
2	70	H			20/30
3	66	I		Iris prolapse	20/70 Opac. vitr.
4	60	H	+ on replacing iris		20/30
5	56	M		Hyphema	20/20
6	67	M		Chor. detach.	20/30 Choroiditis
7	77	H		Chor. detach.	20/30
8	77	H		Iritis	20/40 Choroiditis
9	70	I			20/20
10	60	I	+ followed lens		20/30
11	60	M			20/30
12	67	M			20/100
13	51	I			20/20
14	67	M			20/40
15	74	M			20/200
16	63	I			20/40
17	60	M			20/50
18	84	I			20/50
19	71	M		Diabetes Chor. detach.	20/50
20	73	I			20/20
21	75	I		Iritis	20/20
22	56	I			20/20
23	68	I			20/40
24	56	I		Iritis	20/40
25	69	I			20/40
26	74	M			4/200 Choroiditis
27	78	H		Dementia	20/40
28	60	M		Iris prolapse	20/30
29	63	M			20/20
30	72	I			20/70 Opt. atrophy
31	70	H			20/30
32	66	I			20/70 Ret. pigm.
33	71	M			20/40
34	52	I			20/20
35	60	H			20/30
36	68	H			20/20—
37	69	I			20/20
38	73	M			20/50 Mac. Corn.
39	50	M			20/20
40	56	I			20/40
41	58	H	+ followed lens		20/20
42	73	M			20/20
43	84	H			5/200 Choroiditis
44	54	I			20/20
45	57	H			20/50 Mac. Corn.
46	77	I			20/20
47	55	M			20/20
48	61	I	+ followed lens	Iris prolapse	20/30
49	67	I		Diabetes	20/20
50	57	M		Iritis	20/20
51	77	M			20/30
52	63	M			20/20

No.	*Age.*	*Cataract.*	*Vitreous or Complications.*	*Healing.*	*Final Result.*
53	63	I			$^{20}/_{20}$
54	78	I			$^{20}/_{70}$ Exud. in retina
55	72	M			$^{6}/_{200}$ Optic atrophy
56	60	I	+ followed lens	Iritis	$^{20}/_{30}$
57	71	H			$^{20}/_{20}$
58	69	H		Iris prolapse	$^{20}/_{40}$
59	52	I			$^{5}/_{200}$ Ret. pigm.
60	54	M	+ followed lens		$^{20}/_{20}$
61	65	H		Iritis	$^{20}/_{20}$
62	57	I			$^{20}/_{30}$
63	77	I			$^{20}/_{50}$ Choroiditis
64	55	I			$^{20}/_{20}$
65	66	H			$^{20}/_{40}$ Choroiditis
66	63	I			$^{20}/_{20}$
67	57	M			$^{20}/_{30}$
68	72	I			$^{20}/_{20}$
69	60	M	+ on replacing flap		$^{20}/_{30}$
70	67	I			$^{20}/_{40}$
71	56	H			$^{20}/_{40}$
72	65	I			$^{20}/_{20}$
73	62	I			$^{20}/_{30}$
74	71	M			$^{20}/_{40}$
75	69	I			$^{20}/_{30}$
76	65	H			$^{20}/_{70}$ Choroiditis
77	57	M			$^{20}/_{20}$
78	55	M			$^{20}/_{20}$
79	55	I	Projection ?		P. L. Vitr. exudate
80	64	I			$^{20}/_{20}$
81	65	M			$^{20}/_{50}$ Optic atrophy
82	58	H			$^{20}/_{30}$
83	67	H			$^{20}/_{20}$
84	60	M			$^{20}/_{20}$
85	59	M			$^{20}/_{20}$
86	65	I			$^{20}/_{20}$
87	69	I			$^{20}/_{20}$
88	42	I			$^{20}/_{20}$
89	70	M			$^{20}/_{20}$
90	65	M			$^{20}/_{50}$ Mac. corn.
91	56	M			$^{20}/_{20}$
92	68	M			$^{20}/_{20}$
93	63	I			$^{20}/_{20}$
94	35	I			$^{20}/_{200}$ Ret. pigm.
95	70	M			$^{20}/_{40}$ Choroiditis
96	68	I	+ on removing speculum		$^{20}/_{60}$ Choroiditis
97	79	M			$^{20}/_{40}$
98	55	I	+ on replacing iris		$^{20}/_{60}$ Opac. vitr.
99	56	M			$^{20}/_{20}$
100	49	I			$^{20}/_{20}$

SUMMARY: Hypermature 18. Mature 38. Immature 44: (Incipient 19, Nuclear 13, Posterior Cortical 11, Punctate 1).

Uncomplicated 78:	Visual results $\frac{20}{20}$, 43; $\frac{20}{30}$, 14; $\frac{20}{40}$, 14; $\frac{20}{50}$, 4; $\frac{20}{70}$, 1; $\frac{20}{100}$, 1; $\frac{20}{200}$, 1.	
Complicated 22:	Maculae corneæ	3
	Central chorioretinal changes	12
	Optic atrophy	3
	Retinitis pigmentosa	3
	Old vitreous exudate	1
Vitreous prolapse 9:	This occurred:	
	On replacing iris pillar	2
	" " conj. flap	1
	On removing speculum	1
	Directly followed lens	5

VISION obtained in vitreous prolapse cases: $\frac{20}{20}$, 2; $\frac{20}{30}$, 5; $\frac{20}{60}$, 2.

Iritis	6
Iris incarceration or prolapse	4
Detachment of choroid (transient)	3
Capsule ruptured during extraction	0
Retrochoroidal hemorrhage	0

Of the 78 uncomplicated cases 71 obtained vision from $\frac{20}{15}$ to $\frac{20}{40}$, i.e., 90%. The vision of the others is underestimated as the patients were illiterate and there was no optical cause for the reduced vision. The number of vitreous prolapse is reduced in this series; it occurred at the end of the operation and was very small in amount. While I do not wish to minimize escape of vitreous, the visual results of this group speak for themselves. The drawback to vitreous is the difficulty of replacing the iris columns, the interference with normal wound healing and obstinate vitreous opacities. Under iritis is recorded any redness of the eye, persisting longer than the average time. These intracapsular eyes are unusually free from any reaction. Hyphema is peculiar in these cases, as the blood seems to particularly adhere to the hyaloid membrane, where it may remain for months.

It is sometimes difficult to grasp the capsule, then the blades must be still further opened and, as in Morgagnian cataracts, the lens bag seized as near the equator as possible. A better hold can also be obtained by tilting the handle of the forceps forward, thus engaging the pointed extremities, though the capsule thereby is more apt to tear.

The percentage of cases in which this subluxation succeeded is about 50% and remains about the same as in the first series.

This phase of the subject is taken up in an article which appeared in these ARCHIVES (vol. l., March, 1921). A suggestion is there made that an attempt to increase the number of successful subluxations be made, by adding, if the subluxation does not promptly take place, pressure with the Smith hook at the lower limbus straight back, thus increasing the intravitreous pressure.

I have been practicing this method now for more than 10 years and an opportunity has been given to examine the late results. I have found no instances in which the eye has suffered any late deterioration or change which might be ascribed to the method of operation. The eyes remained sound and the vision excellent. No case has returned with glaucoma. When extraction was required in cases which had been trephined for glaucoma and later developed cataract, the cataract was easily subluxated and extracted in the capsule and the glaucomatous process did not return. A good deal has been said in criticism of the intracapsular operation from the standpoint of consequent changes in the anterior layers of the vitreous. I have failed to find these changes in the cases operated on by subluxation with the capsule forceps. Updrawn pupils do not occur unless there is vitreous loss, and the shape of the pupil is usually the same as after the capsulotomy operation. Nor have I seen an after-cataract develop. Iris prolapse need not be any more frequent after the intracapsular than after any other method, provided due care is taken to replace the iris columns.

I am more than ever convinced that extraction in the capsule should be our goal and that subluxation by any procedure except by external pressure should be adopted. I realize the shortcomings of a capsule forceps and hope that the question has been solved by Barraquer and his suction method. In any case the operation cannot be made an easy one and requires familiarity and training in the intracapsular technique so brilliantly devised by Henry Smith. Whatever method is finally found to give the best results, it is but the outcome of this pioneer's work.

MELANOSARCOMA OF THE CHOROID OCCURRING IN BROTHERS.[1]

By Dr. ADOLPH O. PFINGST, Louisville, Ky., with Pathological Report by Dr. STUART GRAVES, Louisville, Ky.

(With three illustrations on Text-Plate XXIV.)

INASMUCH as malignant growths of the eye occurring in more than one member of a family have never been recorded in medical literature the report of two cases which recently came under my observation may be of interest.

W. B. G., farmer, age 44, consulted me in February, 1919, with the history that he had noticed a dimness in vision of the left eye a year previously and that the vision had decreased so that by June of that year he could just about differentiate between light and darkness. Diagnosis of retinal hemorrhage was made at the time by the late Dr. Wm. Cheatham. The patient had never had eye trouble of any kind and he gave no history of an injury to either eye. His general health had always been perfect. Family history extending back two generations was negative as regards malignancy. His mother died at 36 of heart trouble following rheumatism and his father was in good health at 80 years. He has, besides the brother included in this report, one sister, age 50, and a brother of 37, both in good health. Examination showed a robust, well developed man of healthy complexion, light brown eyes. The right eye was normal and had perfect function. The left showed an extensive detachment of the retina on the temporal side and upward. Tension taken with McLean's Tonometer was normal. The retina on the nasal side was responsive to light. This man absented himself for a year when he returned with the history of severe pain in the left eye of two weeks'

[1] Read before American Ophthalmological Society, Swampscott, Mass., June 15, 1921.

duration. He was found to be in an acute attack of glaucoma—with hazy cornea, shallow anterior chamber, increased tension, etc. Interior of the eye not recognizable. Wuerdman's Transilluminator showed darkness on the temporal side. Based upon this increased tension and the knowledge of a previous detachment of the retina, the diagnosis of intraocular tumor was made, enucleation advised and allowed. The removed eyeball was fixed in 5 per cent. formaline solution. Anteroposterior section extending through the optic nerve and the middle of the cornea revealed a globular mass about the size of a pea close to the entrance of the optic nerve on its temporal side. The tumor mass had a light chocolate brown color. The retina was entirely detached. The specimen was sent to Dr. Stuart Graves of the University of Louisville for microscopic report.

CASE 2.—Farmer, age 47, while at my office on April 1, 1921, with his brother whose eye had been removed a few days previously, made an inadvertent remark that he felt sure that he had in one of his eyes the same trouble as his brother. He based this belief upon the fact that he had noticed a hairlike body before the left eye for six or eight weeks and that his vision was obscure on one side. As this history was given in a passing way, no attention was paid to it and no examination was made. A few weeks later while on a visit in Washington, he consulted Dr. W. H. Wilmer who made a diagnosis of intraocular tumor and advised enucleation.

Personal history in this case was negative—no history of traumatism nor of any inflammatory eye disease. Family history same as brother. Examination which was made at my office on April 20th, revealed by focal illumination on the temporal side a mass in the vitreous chamber close behind the lens which seemed to be protruding from the ciliary body and which extended to the edge of the normal pupil. Wuerdman's Transilluminator showed the temporal half of the eye darkened. Tension was normal. There was no inflammatory reaction, the exterior of the eye being normal. Vision had been reduced to a perception of light on the nasal side of the retina. The right eye was normal. Vision 20/15.

The left eye was enucleated on April 23d and placed in formaline solution. Anteroposterior section disclosed on the temporal side a black globular mass about ½ inch in diameter of smooth contour and covered with retina. It seemed to spring from the choroid anteriorly and to extend

backward beyond the equator of the eye and far into the vitreous cavity. The specimen was submitted for microscopic report.

Pathological Report (Graves):

CASE 1.—*Gross Description:*—Specimen consists of one-half of eye *26mm* in diameter. It has been cut in middle of plane of optic nerve, dividing latter; in cut surface, springing from junction of retina and nerve, extending laterally from nerve *11mm* and extending into vitreous *5mm* is a chocolate gray, rather spongy tumor. Opposite half, when split at right angles, reveals apparently same kind of tumor about three times as large.

Microscopical Description.—Sections show tumor made up almost entirely of spindle cells supported by very scanty stroma and few blood vessels, those present appearing more as blood channels lined with endothelium and without normal vessel wall. The tumor cells lie in interlacing bundles and contain rather elongated, oval, pale nuclei. In cytoplasm of some cells is an abundance of brownish, finely granular pigment, but these pigmented cells are irregularly distributed and, when section is viewed under low power, are comparatively scanty. Mitoses are very few. Microscopical diagnosis, melanoblastoma (melanosarcoma).

CASE 2.—*Gross Description:*—Specimen consists of half of eye, *27mm* in diameter. Springing from one wall and involving one half of vitreous chamber is dense, homogenous mass of dark brown, almost black substance. The neoplasm extends from region of ciliary body, which seems to be involved in the tumor mass, backward about *22mm* to a point about *12mm* from anterior to the optic nerve. Retina is separated and pushed to one side by this mass. Layer of vitreous humor *4mm* thick is present between the dense mass and the separated retina. Specimen split at right angles to anteroposterior axis shows the dark mass to be rounded about *12mm* in one diameter and *20mm* in the other.

Microscopical Description:—Sections of this tumor show general structure similar to that first case, but the pigmentation is so exceedingly abundant that even a thin section appears almost black and the cell structure is largely obscured; under high power outlines of cells can be seen and these outlines frequently sharply circumscribe the pigment deposit.

It becomes manifest at once that these cases offer nothing of especial interest regarding the points of origin of the growths or their histological structure nor does the individual case present any unusual clinical features. However, the occurrence of identical growths in brothers at about the same time of life is so very unusual that a report of the cases for the sake of future reference seems warrantable. It would seem that as long as the ætiology of malignant growths remains as obscure as it is to-day any data that might eventually be of value in determining this problem should be placed on record.

It is well known that after these many years of research nothing definite has been established regarding the causative agent of malignant growths or in fact of tumors in general. The much quoted hypothesis promulgated by Cohnheim that tumors develop from superfluous masses of simple or complex tissue misplaced during embryonic development, although not universally accepted, still has many adherents who look upon the frequent origin of new growths from congenital abnormalities such as the development of melanomata from pigmented moles and pigmented spots in the uveal tract of the eye as the chief support of this theory. Cohnheim also saw in the frequent development of malignant growths at the muco-cutaneous junctions strong supporting evidence of his embryonic theory. While Cohnheim's hypothesis does not explain why the displaced embryonic cells may lie dormant for years and finally either atrophy or produce new growths, the assumption is warranted that the primary cause of neoplastic growths may be assigned to some cell disturbance, either of an embryonic nature or of a later development and that the various conditions assigned by pathologists as probable causes are merely determining or exciting factors in the individual case. Whether the disarrangement of cells always takes place during embryonic development or whether Ribbert's modification of the embryonic idea that the isolation of the cells which eventually produce the growth probably occur in adult life through the irregular growth of the tissue, it must be remembered that every group of misplaced cells does not form a tumor the development probably depending upon favorable conditions of nutrition and the activity of some exogenous influence.

In recent years it has been suggested that the growth of these dormant misplaced cells is ordinarily prevented by the existence in the organism of some chemical or biological influence of an unknown nature, but probably emanating in the ductless glands of the body, and that a perversion of this internal secretion either by an over-production or an insufficient absorption annuls the inhibitive influence over cell growth. It is suggested by the exponents of this theory that the misplaced cells relieved of the retarding influence of the conjectural endogenous substance become susceptible to exogenous influences which then serve as the determining cause of tumor development. While the theory seems reasonable it must be admitted that it is not based upon adequate facts.

Much time and thought has been given the endeavor to determine the relation between tumor development and certain external exciting influences. All efforts to transmit malignant growths by inoculating living tumor cells or the filtrate of the tumor in the human have been futile. We know, too, that there is at present no direct evidence of a bacterial cause of tumor development or of any other definite extrinsic influence and yet we are all familiar with the many instances in which injurious influences of all sorts preceded the development of tumors, making the causative relation between them extremely suggestive. Nevertheless, we cannot conceive of such injuries causing tumor growth without assuming the existence of some abnormality in the tissue involved. The irritants which by Virchow were called formative irritants and which are now looked upon merely in the light of contributory factors in tumor development, are not necessarily the result of one direct violence but may be due to long continued influences of mechanical, chemical, or bacterial irritation, associated with inflammatory infiltration. Common examples of this kind are seen in the pipe smoker's epithelioma of the lip, malignant uterine growths following long continued acrid discharge, etc.

In considering the exogenous causes of tumor development, it is quite natural to look to parasites, either of animal or vegetable nature as etiological possibilities, though up to the present time growths have not been produced experimentally

by inoculation nor have bacterial inclusions been demonstrated in cells of new growths. McCallum (1) believes that bacteria in order to cause cell growth must be so included in the growing cells as to multiply with them and accompany them wherever they go, since otherwise it would seem impossible that they could maintain their stimulating effect upon the cells which have been transplanted to distant organs. Some twenty years ago pathologists believed to have found within the protoplasm of tumor cells bodies which they considered as protozoa. As late as 1913 Rohdenburg (2) expresses the belief that the existence of blastomycetes in malignant tumors could be regarded as certain and irrefutable. However, later observers have proven that the variously described inclusion bodies were due to degenerative changes in the cell protoplasm and that they bore no ætiological relation to the tumor. Where protozoa were really observed it subsequently developed that the growths containing them were granulation tissue and not sarcoma.

The incidence of heredity in the development of neoplasms, especially as regards the development of malignant growths, has perhaps received more discussion than any other phase of the subject. Although evidence is accumulating in recent years based upon experimental study with mice and other lower animals by Dr. Maud Slye and others, indicating that malignant growths can be transmitted by transplantation of tumor cells in animals and that several generations following the occurrence of the disease in an animal are prone to develop a like condition, yet we have no corroborative evidence in the human in which all inoculation efforts have failed. The frequent appearance of similar growths, especially of a malignant type in different generations of a family, would make it appear to the casual observer that there frequently is a family predisposition to tumor formation, yet statistical proof to warrant this belief is wanting and it is now pretty generally conceded that heredity does not play a notable part in tumor development. As it is practically impossible to obtain complete family histories through more than two or three generations, and as collected figures represent the minimum rather than the maximum of familial growths, there is difficulty in drawing accurate conclusions, hence statistical proof regarding

heredity is necessarily unreliable. As evidence of the uncertainty of such statistics, Warthin (3) relates his observations that among 3600 cases of neoplasms of all kinds seen at the University of Michigan from 1895 to 1913 complete family records could be obtained but 13 times. In view of the statistical data indicating an infrequent hereditary tendency to the development of neoplasms and based upon the great frequency of growths, especially those of a malignant type, it is a reasonable assumption that the cases of tumor producing potentiality in families rather followed the law of chance and that the development of tumors in different members of the same family was merely coincidental.

Melanotic sarcoma (melanoma, melanoblastoma) of the uveal tract represents the most frequent variety of tumors of the eyeball occurring in adults. According to Fuch's statistics it occurs in .07 per cent. and Wintersteiner in .05 per cent. of ophthalmic cases. Most cases are observed between the 40th and 60th years. All reported cases of melanoma of the uveal tract have been primary growths, no instance of metastic growths of the eye having been recorded. As far as is known they are always malignant and they frequently give rise to metastases by way of blood and lymph. They spring from any portion of the tract but most frequently from the choroid and are believed by Ribbert (4) and others to be the result of proliferation of the meoblastic cells and a differentiation of many of the cells into pigmented cells or melanoblasts. The cells are of a definite type, usually spindle shaped and are characterized by the production of pigment within the cytoplasm in the form of granules, varying in color from a light brown to a black. The great majority of sarcomas of the uveal tract are pigmented though the origin of leucosarcoma in the pigmented coat of the eye is not uncommon.

Whereas malignant tumors have been known to occur in the eye even before the time of Hippocrates little or nothing was known of their pathology until the early part of the 20th century when the advent of the microscope opened up a new era in the study of malignant growths. But even with this important adjunct added to our methods of research the ætiology of tumors of the eye is as obscure as it was years ago and as it is regarding tumors in general.

Applying the theories of the cause of tumors to melanoma of the choroid and ciliary body it would seem that tumors develop in the eye under conditions similar to those which have been thought to influence the development of neoplasms elsewhere and nothing is definitely known of their specific ætiology. Borst (5) like Cohnheim, believes that during embryonic growth a superfluous and imperfect tissue develops in the uveal coat. He believes that an overproduction of pigment takes place in isolated cell growths which predisposes to cell proliferation and to the formation of new growths. Others (6) believe that some form of inflammations in the uveal tract results in the formation of scar tissue from which the neoplasm takes its origin. Fuchs (7) who approved this theory classed these inflammations with the traumatic causes in his count of eleven per cent. of cases among 259 sarcomas of the uveal tract in which he assigned trauma as the cause of uveal growths. If these cases were eliminated a history of trauma could not be elicited in many instances of tumors of the interior of the eye. The large number of tumors of the uveal tract that have been reported and the infrequent instances in which trauma was assigned as the causative agent and the position of the uvea protected from all kinds of traumatic influences seems to controvert the theory of trauma acting as an exciting cause of the development of eye tumors.

The protected positions of the middle coat of the eye would also lend little support to the parasitic theory of tumor development, even as a contributory cause.

As far as our present knowledge goes there is little evidence of heredity influencing the development of ocular growths. Regarding the influence of heredity on the development of melanoblastma of the eye, Wintersteiner (8) points out the fact that the entire ophthalmic literature contains but two cases that were suggestive of an hereditary influence in the development of eye tumors. One of these cases reported by Silcock (9) which has been frequently quoted occurred in a girl of 20 whose eye was removed on account of melanosarcoma of the choroid. Her mother at the same age had one of her eyes removed for the same reason while her maternal aunt died of a malignant growth of the breast and the maternal grandfather of a melanoma of the choroid. Notwithstanding

this pronounced case Wintersteiner concludes that heredity is not an important factor in the ætiology of neoplasms of the eye.

Whether the occurrence of two identical growths springing from the same structure in the eye developing in brothers at about the same time of life will prove to be of future value in determining the ætiology of eye tumors is problematical. For the present it would seem that heredity played no part in their development, and that their occurrence must be looked upon as one of those rare coincidences that are at times encountered in the practice of medicine.

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PRACTICAL POINTS IN CATARACT EXTRACTION EMPHASIZED IN COL. HENRY SMITH'S TECHNIQUE FOR INTRACAPSULAR EXTRACTION.[1]

By Dr. CLARENCE KING, Cincinnati, O.

DISCUSSIONS of the Smith operation have usually centered in the question of its acceptance or rejection as a routine method of cataract extraction. This tendency has diverted attention from the fact that many features of Col. Smith's technique can be incorporated into the old operation with striking advantage. Every operator owes it to himself to devote the closest scrutiny to the details of any method which has received the sanction of Col. Smith's vast experience, and should endeavor to give his recommendations as wide an application as possible in his own practice. In making this effort, one will realize what a tremendous service Col. Smith has rendered to ophthalmology in stimulating oculists to strive for the attainment of the highest ideals in cataract surgery and in stifling that complacency which makes for contentment with present methods.

In considering cataract surgery, one cannot help being impressed by the extent to which the success of the operation depends upon the perfection with which the details of technique are carried out. All eye surgeons have encountered difficulties during operations; and we know, theoretically and practically, the troubles that beset the knife of the unwary. On analyzing the cause of some occurrence which we might wish to have avoided, we almost invariably find that it had its inception in the failure of some seemingly insignificant de-

[1]Read at meeting of Ohio State Medical Society, Columbus, Ohio, May, 1921.

tail of our procedure. After the groundwork of an operator's technique is established, it is in its details that we expect to modify it to advantage. This emphasis of detail will afford, it is hoped, some justification for a brief reference to technical points which are apparently trivial in a verbal description but which, as part of the sequence of a cataract operation, have a cogently practical importance.

It was the good fortune of the essayist to have spent a cataract season as Col. Smith's guest at Amritsar and to have had the privilege of doing two hundred and six intracapsular extractions under his supervision. To the observer of Col. Smith's work, it was manifest that in evolving his technique for extraction in capsule, he had made valuable contributions to cataract surgery in general. The observations that follow are derived from notes made at the time of the visit mentioned. Successive steps of the intracapsular operation are considered in relation to their availability for the capsulotomy method.

In preparation for the operation, Col. Smith's method of flushing the conjunctival sac attracts our attention. This preliminary can be employed profitably in any operation on the eyeball, as the entire surface of the sac can be definitely exposed to the action of the flushing fluid. Briefly, the procedure is as follows:

The speculum is inserted and opened. In this position, it is drawn directly forward by one hand, thus lifting the eyelid from the eyeball, while the fingers of the other hand are occupied in grasping the eyebrow and sliding it upward. This manipulation exposes the fornix with the minimum of mechanical irritation to the action of the fluid used.

Two details characterize Col. Smith's method of fixation. He braces the ulnar side of his left hand and little finger against the patient's cheek and side of the nose. To use his own expression, he has "the feeling that he controls the patient's head between his hands." He points out that improper support of the fixing hand is often the cause of that pressure with the fixation forceps, which we all know is so disastrous. A second point typical of his fixation is that after he has taken hold in the usual position, he gives a quarter turn to his forceps. This maneuver gives a more certain grip.

There is an old French adage to the effect that as the incision

is, so is the operation. Although some surgeons are not disposed to agree with this generalization, they will admit that the incision plays a predominate part in the success of a cataract operation. All who have worked with Col. Smith must have been impressed with his marvelous dexterity and facility in making an incision. To one who was familiar only with the traditional "to-and-fro" sawing motion, it was astounding to see, quite frequently, a section completed by one straight, smooth thrust of the knife without the least bit of withdrawal. It was immediately obvious that this facile motion was no mere spectular flourish; for the symmetry of the section, the smoothness of its edges, and the ease with which it was completed, disclosed its many advantages in promoting the ready healing of the wound and in minimizing trauma. The outstanding features of Col. Smith's incision are that it is made by finger movement *only* and that there is no short sawing back and forth. He crosses the anterior chamber slowly. Immediately after the counter puncture is made, the handle of the knife is depressed; the knife is thrust upward; the upthrust occurs more rapidly than the through thrust, and severs a large part of the inner, upper corneal quadrant. As the knife is farther advanced, the handle is elevated so that with the proximal end of the blade, the outer upper corneal quadrant is sectioned. This manipulation brings the blade horizontal; and if its cutting surface has been used up, a slight withdrawal suffices to cut the remaining corneal bridge. In some cases, at this point in the incision, advancement is still possible; and the section is completed by advancing the knife to the heel without withdrawal. This maneuver implies a definite way of holding the knife. Col. Smith gives the following description:

"In holding the knife, an operator should catch it as one holds a pen in writing and hold it, if anything, more lightly. His hold of the knife should be fairly long; that is, a good distance from the blade. The back of the terminal joints of the little finger should rest against the front of the temple and the ring finger should rest on the little finger and against the temple; the fingers and thumb, holding the knife when in the straight position as a pen in the act of writing, should now be drawn back without shifting back on the handle of the knife,

as far as convenient, so that they look in the position of a partially closed fist."

Wrist motion in the incision implies sawing and has not the delicacy of the finger motion. A section made principally by wrist action is the logical consequence of certain methods of holding the knife. A traditional hold of the knife which predisposes to wrist motion is described by Czermak in *Die Augenärztlichen Operationen*. A translation is as follows:

"The knife is not held like a pen. It is gripped with the thumb on one side, and the index and middle fingers on the other side in such a way that the axis of the knife makes a right angle with the axis of the thumb. The elbow should be applied to the body, and all movements should be made with the wrist."

It is to be noted that the thumb is extended and braced against the pull of the index and middle fingers. These methods are explicitly contrasted in order to direct attention to the fact that an operator may frustrate his purpose to make use of the delicacy of finger motion if he uses an unsuitable grip to which he had previously become accustomed. It may be useful in this connection to suggest that the maximum finger motion takes place in a cataract incision if the knife is held in the direction of the long axis of the fingers and thumb; and that the greatest restriction occurs if the knife is held with a short grip at right angles. Briefly, Col. Smith's incision is a thrust with the fingers, a withdrawal taking place if necessary. Its merits commend it to our careful study.

A consideration of the cataract incision naturally turns our attention to the lens that must pass through it. Many operators are skeptical as to the possibility of making an accurate prediction about the contents of the capsular sac; they look upon any forecasts as having no value in practice. In Col. Smith's clinic, great attention was paid to the probable size, shape, and consistency of the lens. In certain typical cataracts, an accurate prediction could easily be made. Attention to this detail by the operator during the capsulotomy extraction will very often enable him to be prepared for an emergency which might otherwise take him by surprise.

One feature of Col. Smith's method of iris reposition can be worthily applied to the old capsulotomy operation. In

replacing the iris after iridectomy Col. Smith not only strokes the pillars into position in the usual way but also passes the repositor upward in the direction of the ciliary body to free the root of the iris from the upper lip of the wound. He lays great stress upon the fact that during this maneuver all pressure must be removed from the eyeball by the lid-hook. This method of replacement is especially useful where a corneal section has been made, but obviously it has a wider application.

In his book on the treatment of cataract, Col. Smith recommends the strabismus hook for expressing the lens in the capsulotomy operation. The operator stands behind the patient's head, makes slight pressure on the sclera above the wound with Smith's spatula held in the left hand and applies the convexity of the end of the hook to the lower part of the cornea. He then makes steady pressure upward toward the wound, following up the movements of the lens by sliding the hook up after it. Col. Smith insists that no relaxation should occur after the nucleus has escaped but that steady pressure should be maintained as the hook follows the escaping cortex up to the edges of the wound. One way for an operator to convince himself of the value of the strabismus hook for this purpose is to use some other method to express the lens in a case with a good deal of cortex and to persist until no more cortex can be expelled, and ***then*** to try the strabismus hook. In many such cases he will be gratified to find that more cortex can be expressed without dangerous pressure. The result may not be as satisfactory as it would have been if the hook had been used as indicated in the beginning; but the trial affords a good way to make comparisons, and the disadvantage will not be with the instrument which Col. Smith recommends for the purpose.

The reference to the strabismus hook suggests the way in which he uses the spatula and hook in the intracapsular operation when vitreous loss is impending as the lens is being delivered. When vitreous presents between the lens and the upper lip of the wound, Col. Smith passes the spatula into the wound. Holding it steadily and using it to hold back vitreous and to act like an inclined plane he uses the strabismus hook to slide the lens upon it. The extent to which the spatula has to be introduced varies according to the conditions present.

If the vitreous merely presents itself in the wound, only the tip is entered. If a large amount of vitreous is lost and the lens is dislocated, it has to be passed well into the vitreous. The important part is that, in any case, it acts as a plane upon which the lens is caused to glide upward. Reisinger's double hook or a spoon or a loop have usually been employed for this purpose in the past.

In all these maneuvers, especially when the patient is unruly, Col. Smith's method in controlling the lid is of the utmost usefulness. The one using the hook stands at the patient's left. The hook is passed under the upper lid, is inserted at the outer angle and slid gradually toward the center. A short grip is taken on the hook with the thumb and index fingers of the right hand. The shaft is held between these fingers as one would hold a pen. The other fingers are employed to push the brow upward; their nail surfaces are applied to the brow, and the brow is pushed up over the orbital margin by extending them. The lower lid is drawn down by the left thumb, the left hand and fingers being applied to the patient's cheek. All the connections between the eyeball and its bony framework are drawn forward, and the eye sinks toward the apex of the orbit.

The writer is aware that all those who concern themselves with the cataract operation are familiar with the literature of the subject in which the above procedures are described. They have usually been considered exclusively part and parcel of the intracapsular operation. It appeared that a useful purpose might be served to recall and briefly summarize, for those who do not do the intracapsular extraction, certain features of the Smith operation which have been proved to be of extreme value in the older method and which are, of course, but incidental phases of Col. Smith's greater contribution in giving to Ophthalmology, and thus to humanity at large, his method for the intracapsular extraction of senile cataract.

TREATMENT AFTER CATARACT OPERATIONS.[1]

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THE treatment after any operation is of paramount importance, and the biggest part of the problem is to make conditions most favorable for Mother Nature to do her work with the least effort and in the shortest time. My belief is, that this is done most perfectly when the ordinary routine of life is least disturbed.

It is wise to disturb the psychic, nervous, and physical routine of the patient just as little as possible. His sensibilities, his feelings, his manner and habits of thought should be kept going along in their accustomed ways. His sleeping and eating, his goings and comings, should be altered just as little as is consistent with the nature and care of the lesion.

There will probably be a general acceptance of this principle, but a very wide divergence as to its application.

Through several years of quite close observation of the healing process following cataract operations, I was impressed with the universal complaint concerning the back; with the rather frequent mental disturbances; with the suffering at times from acute retention of urine, and more or less renal disturbance. When it fell to my lot to take the responsibility for these patients, I felt constrained to find relief, if possible, from these conditions.

Tradition and conservatism so bind us and hedge us in that in the presence of a great responsibility we are likely to be timid, but what seemed absolutely necessary here was relief from at times almost intolerable suffering. To lie on one's

[1] Read before the Ohio State Medical Association, May 4, 1921, Columbus, Ohio.

back for twenty-four or forty-eight hours or longer is a task to tax the endurance of a much stronger and more patient person than is a great proportion of cataract patients. I wondered if this could not be less rigidly enforced and no harm be done.

Acting in accord with the belief expressed above and this hope, greater freedom of action was granted. The patient's body was turned toward the side of the unoperated eye, when he complained of his back. Later, the head, which previously had been placed between sand bags to help him retain it in position, was shifted. A considerable measure of relief was obtained and gradually more and more freedom was given with less and less suffering until at present the custom is not to inhibit the freedom in any marked degree except during the first twenty-four hours.

Generally speaking the treatment is routine and symptomatic. The routine procedure is as follows:

Immediately after the operation the eye is closed naturally and gently. Vaseline is placed over the lids of both eyes and a half round pad is placed over each eye. Over this is placed a full round pad of the same structure. These are fastened on with adhesive strips. Over this, over the operated eye, Dr. Fox's aluminum shield is placed and secured with adhesive strips. Over both eyes next is placed another pad and a mask. I am convinced that most of this is quite unnecessary but so far have not had the courage to break away from custom.

The patient is instructed to lie perfectly quiet, but if he complains of his back, he is turned to the side opposite the operated eye.

On the morning following the operation the bandages are removed, the eye opened and examined. Usually the anterior chamber has formed and the wound is closed. The eye is again closed after gently bathing the lids with a boracic acid solution. The half round pad and the full round pad are placed over the operated eye. The patient is given the use of the unoperated eye.

On a great many of these old people, the effect of keeping the eyes bandaged seems to be to bewilder and confuse the mind, inducing a feeling of fear and a desire to protect himself from impending danger. A form of dementia, more or less

violent, may follow which may or may not cause harm to the eye, but certainly is very distressing to all concerned. Since adopting the above procedure we have had no post-operative dementia. During this first day after the operation the patient is given a back rest and permitted to sit up in bed.

On the second morning the eye is dressed again and a pad hung loosely over the eye, giving perfect freedom for the lids. The patient is permitted to sit in a chair. From this on almost absolute freedom of action is given him. The eye is kept shaded since the light is borne rather poorly by the sensitive retina.

On the third or fourth day dark glasses and a brow shade are prescribed. The patient is kept in a somewhat darkened room for several days. Each night a pad is placed over the eye and over this a metal shield or mask to protect the eye from the sleeping patient. Usually at the end of a week or ten days the eye is ready for a preliminary test of vision. Glasses are fitted after two or three weeks. A change may be necessary after several months.

Under this routine, suffering in the back—post-operative insanity—bladder and kidney troubles have been practically eliminated. There have been fewer inflammatory processes and several probable infections aborted. Perhaps the most pronounced result obtained by this more or less open treatment, has been the relief from acute retention of urine and absolute freedom from kidney lesions. One of the most severe cases of acute retention I have seen and one that influenced me most in this form of after treatment, occurred four years ago.

Mr. S. W. D., eighty-one years of age, operated on about 8.30 in the morning, in his bed at his home. Trained nurse in constant attendance. In the early part of the afternoon he complained of some distress in the region of the bladder. In the evening his family physician was called and relieved him with a catheter. He had an uncomfortable night and when I called the next morning about eight o'clock, I found him standing beside the bed with a urinal doing his best to void the urine. I had him lie down that I might examine the eye, expecting to find everything gone wrong. On the contrary the wound was closed, no redness, and all was looking well. He was given the other eye and granted permission to sit in a chair or walk about the room. His physician looked

after the bladder trouble which continued for several weeks. The eye became slightly inflamed and was treated with atropine for a week or more, but went on to recovery with $\frac{20}{15}$ distance vision and ability to read Jaeger one with ease. The patient lived nearly four years after this operation and retained his vision to the end.

This form of treatment, or lack of treatment, gives an excellent opportunity to do what is possible to avoid or abort an infection. To bandage the eye and keep it bandaged makes a very good incubator, since the three essentials of an incubator are all supplied, namely, warmth, moisture, and darkness.

Under symptomatic treatment are included all complications which may occur, such as prolapse of vitreous or iris, delayed healing of the wound, and any inflammatory processes such as iritis, iridocyclitis, keratitis, conjunctivitis, and so forth, inflammations of the cornea, iris, and uveal tract are given the ordinary treatment with atropine and dionin.

Hernia of vitreous or iris, I let alone, and get the patient on his feet. Presuming that the incision is made upwards, I am convinced that the urge from within the globe is not so great on the wound when the patient is in the upright position as in the prone. There being less strain or tension on the wound, it heals more rapidly. The hernias usually will reduce without manipulation.

Briefly then: believing that the best treatment is that which interferes least with the patient's psychic and physical activity, I have attempted to relieve him, wherever, whenever, and as soon as possible of anything which might disturb the ordinary functions of mind and body, and yet keep well within the bounds of safety so far as the healing of the wound is concerned.

GLIOMA RETINÆ TREATED BY X-RAYS WITH APPARENT DESTRUCTION OF THE TUMOR AND PRESERVATION OF NORMAL VISION.[1]

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(From the Massachusetts Charitable Eye and Ear Infirmary.)

THE first attempt to treat a glioma retinæ[2] by radiation was made in 1914 by Axenfeld (1) who employed X-rays and mesothorium. The result at first seemed successful, although a cataract developed which required operation, but recurrence of the growth took place within three years after the beginning of the treatment, and the eye was enucleated. Subsequently other unsuccessful attempts have been reported by Kusama (2) (3 cases), Janeway (3) (2 cases), Knapp (4) (1 case).

In each of Kusama's cases both eyes were in the second stage, and were treated by exposures to X-rays and radium. Shrinkage of all six tumors took place, accompanied by shrinkage of the eyeballs. Death from metastasis occurred in each case; in one 11 months, in another 18 months, and in the other case 27 months, after the beginning of the treatment. In two cases there were general metastases, while in the other the patient died with symptoms of intracranial involvement. Kusama believed that the phthisis bulbi was due to direct action of the radiation upon the eye, but to me it seems possible if not probable that it was secondary to degenerative changes in the tumor. For it is well known that glioma retinæ may undergo extreme necrosis and thus cause degenerative changes in the eye, and even marked phthisis bulbi. I have examined micro-

[1] Read before the American Ophthalmological Society, June 15, 1921.

[2] The term glioma retinæ is a misnomer because these tumors never produce neuroglia, and are highly malignant, but it is so commonly employed that any other term would lead to confusion.

scopically the eye from such a case, reported by Dr. T. O'Connor. Kusama concluded that in his cases the treatment by radiation hastened the occurrence of general metastases. This conclusion also seems doubtful to me, because disregarding the effects of the radiation, the chances of general metastases occurring were enhanced by the facts that the cases were bilateral and none of the eyes was enucleated.

Janeway treated six cases of glioma retinæ with radium. Two cases were later reported in detail, one by Schoenberg and the other by Knapp, while two others could not be followed. In the two remaining cases, which were in advanced stages, no improvement followed the treatment.

In Knapp's case a glioma was discovered in the second eye $4\frac{1}{2}$ years after removal of the first. The tumor consisted of two main masses and was of considerable size. Treatment with radium was followed by temporary improvement, but after six months the tumor began to enlarge and the eye was ultimately enucleated. Neither of the eyes in this case was examined microscopically.

Duncan treated with radium recurrences in the orbit after enucleation in three unilateral cases with apparent success, although eighteen months was the longest period of observation.

Up to the present, only two cases have been reported in which an eye containing a glioma retinæ has been treated with radiation with apparent success. In Hilgartner's case (cited by Schoenberg (7)), the right eye was completely filled up with the growth while the other contained only a small growth. After 84 exposures to X-rays, the right eye shrunk and the growth in the left eye resorbed. In Schoenberg's case (7) the second eye was treated with radium 3 times in 26 months, beginning 3 weeks after removal of the first eye. The tumor in the second eye consisted of a grayish white mass occupying an area a little larger than the lower nasal quadrant of the eye-ground, and a smaller grayish mass 4 — 6 P. D. in size in the upper part of the fundus. As the result of the treatment the tumor underwent retrogressive changes, but it is not stated that it became reduced in size. At the end of $3\frac{1}{4}$ years after beginning treatment the patient had vision of $\frac{20}{100}$ and the glioma appeared as a "degenerated necrosed mass." A posterior cortical cataract was observed at end of $2\frac{1}{2}$ years.

In the following case, that I have to report, the tumor was much smaller than any other yet treated by radiation and the result at the present time, over three years after the treatment was begun, is remarkably successful.

CASE.—Harry G. aged 17 months, was referred to me by Dr. John Kerrigan on November 22, 1917. One week previous the mother had observed a white reflex from the pupil. Two brothers, aged 12 and 8, and a sister aged 6, had normal eyes, and the family history was otherwise negative. On examination the right eye showed a typical picture of glioma retinæ at the end of the first stage—shallow anterior chamber, dilated pupil, moderate increase in tension, and a vascularized yellowish white mass in contact with the posterior surface of the lens. The left eye appeared to be normal, but without general anæsthesia a satisfactory ophthalmoscopic examination could not be made. Immediate enucleation of the right eye was advised to be followed by X-ray treatment of the right orbit and careful observation of the left eye.

November 24, 1917, the right eye was removed by Dr. Kerrigan and sent to me for pathological examination. Soon afterwards the right orbit was given five severe X-ray treatments by Dr. William Liebman at the Massachusetts Charitable Eye and Ear Infirmary.

May 2, 1918, the patient was again referred to me by Dr. Kerrigan for observation. I now found in the retina of the left eye in the lower outer quadrant a white opaque elevated mass, irregularly oval in shape and about 4 P. D. in greatest diameter. It did not reach to the limit of the ophthalmoscopic field. Near this mass, but entirely separate from it, were two small white spots each about ¼ P. D. in size. The patient was immediately referred to Dr. Liebman for X-ray treatment of the left eye, with instruction for sub-erythema dosage to be employed and the exposures to be made through a perforated lead plate so as to protect the lens and anterior part of the eye. Dr. Liebman gave the first treatment on the same day, a sub-erythema dose through a 5*mm* aluminium filter. After this, similar treatment was given once a week for three weeks, and on June 6th, June 27th, August 1st, November 1, 1918, and on January 17, 1919.

The patient was seen by me at intervals of one or two months, but without general anæsthesia it was impossible to make a careful study of the ophthalmoscopic appearances, only glimpses of the tumor as a rule being obtained. On May 23, 1918, I noted that the tumor appeared less white. On August 1st, the tumor appeared translucent and smaller

in size. October 19, 1919, the patient was examined under ether narcosis. The tumor appeared translucent, somewhat smaller and less elevated. The white spots near it had completely disappeared.

April 4, 1921, a good view of the tumor was obtained. It appeared only slightly elevated, gray and translucent, and somewhat smaller than the original tumor. Its outline was fairly sharp in places, but not easily seen. No traces of the white spots could be found. A few small vessels traversed it. The retinal vessels became tortuous as they approached the tumor.

On June 8, 1921, another good view of the tumor was obtained. This time there was seen just below its center, a circular depressed area, about $\frac{1}{3}$ P. D. in size, slightly pink in color in contrast to the rest of the tumor. Its margin was sharply defined. My attention was called to this area by Dr. Schoenberg who examined the patient with me on this date. No doubt I had previously overlooked it. It suggested to me a shallow hole in the tumor, perhaps due to rupture of the retinal surface at some time. There was no pigmentation either within or around the tumor. The lens was still clear and the vitreous remained free from opacities. Owing to the youth of the patient it was impossible to obtain an accurate idea of the visual acuity, but by the use of a chart with pictures it was determined as certainly better than $\frac{20}{50}$. The mother said that according to her observation the vision of the child was excellent. Since the macula was uninvolved there is no reason to believe that the child's vision was not perfectly normal.

Pathological Examination of Right Eye.—(3403) The globe is normal in size and shape. On section, after fixation in 10% formalin, the retina is found to be completely separated by serous coagulum and to enclose a tumor mass which takes up about $\frac{3}{4}$ of the globe. The tumor extends from the optic disk to the posterior surface of the lens to which it is closely applied. It thus completely replaces the vitreous body. The anterior chamber is shallow, but not obliterated.

Microscopic Examination.—The tumor is found to be a typical so-called glioma retinæ. Perivascular arrangement of the tumor cells is well marked, and the occurrence of intervening areas of necrosis is, as usual, a conspicuous feature. Some of the areas of necrosis show calcification. Typical rosettes are extremely abundant in almost every portion of the tumor. The cells not taking part in the rosette formations have round, ovoid, or pear-shaped nuclei, and often show indistinct bipolar processes. Cells in mitosis are numerous. On one side the tumor has entirely destroyed the retina, and on the other side it is in contact with the latter and in

places has invaded or penetrated it. The tumor extends up to, but has not invaded the optic disk or nerve. Small metastatic nodules of tumor cells are found on the surface of the pigment epithelium, and on both surfaces of the retina where the latter is reflected over the ciliary body and has not yet been invaded by direct extension of the growth. No nodules are found in the anterior chamber or in the iris. The growth is nowhere in direct contact with the choroid and has not invaded the latter either by direct extension or metastases.

The ciliary body is compressed by the retina. There is no peripheral anterior synechia. The iris, cornea, and lens are normal.

Pathological Diagnosis.—So-called glioma retinæ endophytum.

Remarks.—While the tumor in the right eye was comparatively large, and had given rise to intraocular metastases, it had not invaded the optic nerve or choroid so that the probability of a recurrence in the orbit was less than is often the case. It is, therefore, impossible to say whether or not the absence of tumor recurrence in the orbit was due to the X-ray treatment.

That the tumor found in the left eye was also a so-called glioma there can be no doubt. For it was certainly not an inflammatory condition, because it was not associated with vitreous opacities or other evidences of inflammation, and there is no other known non-inflammatory condition of the retina which resembles it. The treatment with X-ray caused little apparent reduction in size of the main tumor, but did cause complete disappearance of the two small white nodules situated near it. It also caused a marked change in the appearance of the main tumor, the latter losing its original opaque white appearance and becoming gray and translucent.

In Axenfeld's case in which for a time the treatment was regarded as successful, and also in Schoenberg's case, cataract developed, while in my case the lens has remained perfectly clear.

In my case the lens was carefully protected from exposure by means of a lead plate. The situation of the tumor, just behind the equator in the lower outer quadrant rendered this an easy matter, but it would seem that in any case in which the tumor

could be recognized with the ophthalmoscope and in which there was still useful vision, it should be possible to make the exposure through the sclera, first on one side and then the other, and thus avoid possible injury to the lens. I am not, however, convinced that the cataracts in the cases of Axenfeld's and Schoenberg's were certainly due to radiation, because it seems possible that they might have resulted from toxins given off by the necrosed tumor masses. It is of course well known that all degenerative conditions affecting the posterior part of the globe are apt to cause posterior cortical cataract.

While in my case the results of the treatment have thus far been remarkably successful, it is possible the growth may yet resume its activity, or that another tumor may develop. In this connection Maghy's (8) case of bilateral glioma, in which the second eye did not become obviously involved until the patient reached the age of 15 years, is suggestive. As Knapp points out, a few cases of bilateral glioma have been recorded in which a small tumor in the second eye has undergone retrogression with preservation of vision, but these are so exceedingly rare that they scarcely need to be taken into account.

Judging by the large number of cases of glioma retinæ that have now been unsuccessfully treated by radiation it may seem that this form of treatment does not offer much hope of success. It is to be noted, however, that the tumors in these cases were all large, whereas in Schoenberg's case, and especially in my case, the tumor was very small. The results so far obtained, therefore, seem to render unjustifiable attempts to treat an eye by this means when the tumor is so large that useful vision cannot be expected. It is possible that even a relatively small tumor, if rendered completely necrotic by the radiation, would cause degenerative changes in the eye which would ultimately destroy all of its vision. As a matter of fact, a child affected with retinal glioma is practically never brought to the ophthalmologist until in one eye at least the tumor is so far advanced that immediate enucleation is imperative. In general, therefore, treatment of retinal glioma by radiation must be restricted to the second eye, after removal of the first, and to the after treatment of the socket to prevent recurrences. At the time of the enucleation of the first eye advantage should

always be taken of the ether narcosis to make a thorough ophthalmoscopic examination of the other eye.

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SPONTANEOUS HYPOTONUS IN JUVENILE GLAUCOMA.

By Dr. ALFRED H. RIEDEL, New York.

INSTANCES of spontaneous reduction of tension, with preservation of vision, in cases of congenital glaucoma have been observed by Fuchs (1), Peters (2), Collins (3), Axenfeld (4), Carlotti (5), Kayser (6), Fage (7), Pyle (8), Reis (9), and others. This condition is, of course, different from reduction of tension following pathological causes, such as inflammation, detachment of the retina or rupture of the eyeball, which often usher in the terminal stages of this disease (Axenfeld (10), Knapp (11)).

Theories attempting to explain the spontaneous reduction of tension in glaucoma have been advanced by Axenfeld (4), Collins (3), Fage (7), and others, and will be referred to later in this paper.

It is generally agreed that infantile glaucoma is brought about by arrest of development of structures at the filtration angle. The most common congenital defect is the total absence of Schlemm's canal, which occurs in about 50 per cent. of the cases (Hamburger (13)). The venous plexuses about the canal may also be undeveloped, or the ligamentum pectinatum retain in part its fetal structure (Reis (9), Treacher Collins (3)). The filtration angle may be solidly blocked by these structures (M. Diem (15), Chaja Spielberg (16)), or only a few retaining strands may be stretched across it from the root of the iris to the posterior surface of the cornea (Reis (14), Collins and Mayou (17), Parsons (27)). Furthermore, in favor of such a theory, speaks the fact that in nearly 50 per cent. of the cases of hypertension in the young, other evidences of

arrested development, or other congenital anomalies, have been observed; such as persistent hyaloid artery, pupillary membrane, coloboma, irregularity in the size of the cornea or of the eyeball, etc. (Löhlein (22)).

The clinical picture of hypertension in the young runs through innumerable variations from that of typical buphthalmos, beginning at birth, to glaucoma, as seen in its senile form. Clinically this is separated from the true senile form only because none of the injurious agents incidental to later life can be demonstrated. All forms of hypertension in the young, with the exception of the early senile forms, if not secondary to some other condition, are looked upon as congenital or hereditary (familiar). But here again the various forms of hypertension are so intertwined that the ungenital, as well as the hereditary form, may occur collaterally in the same family. For instance, it is recorded that three sisters had glaucoma simplex (juvenile glaucoma) while a fourth sister, not the oldest nor the youngest, showed a buphthalmos from birth (Löhlein (22)). Furthermore, both forms have been seen in the same patient (Hirschberg (23)).

The association of congenital glaucoma with myopia is quite common; 50 per cent. of the patients are myopic, as compared with 15 per cent. of those suffering from the senile form. Twenty per cent. of those not considered frankly buphthalmic have a deep anterior chamber, a condition not seen at all in the senile form of glaucoma. The patients with deep anterior chambers are nearly all myopic, seldom emmetropic, never hyperopic (Löhlein (22)).

Horstmann (25) and Levinsohn (26) have examined the refraction of children ranging in age from a few days to about a year. Levinsohn used the shadow test. Both worked independently, and both reached identical results, so their observations may be considered to be correct. They found that 50 per cent. of all children showed hypermetropia of 3 to 4 diopters; 10 per cent. only were emmetropic, and 2 per cent. myopic. The incidence of myopia among the population of Germany generally is about 15 per cent., and among the sufferers from senile glaucoma about the same. On the other hand, patients with congenital glaucoma, as already stated, show 50 per cent. of myopia. This shows that some congeni-

tally myopic eyes have a tendency towards hypertension, or that myopia and hypertension arise from a common cause, or that myopia is produced after the establishment of hypertension, or, if already present at birth, is increased. The latter occurrence has been observed several times.

The following case is of interest as illustrating the spontaneous reduction of tension in a case of juvenile glaucoma occurring in a child of 13.

CASE HISTORY.—Lillian B., aged 13 years, a Hebrew with dark hair, undersized, well-nourished and mentally alert, came to the Clinic of the Herman Knapp Memorial Eye Hospital on October 20, 1917, complaining of poor vision for the last five years. Vision with her glasses was R. $-8.00 = \frac{20}{200}$; L. $-8.00 = \frac{30}{100}$. Tension (Schiötz) R. 70; L. 60*mm* Hg. The pupils were irregular and reacted sluggishly to light. The anterior chambers were not uniform in depth throughout, but were not deep. The corneæ were somewhat over 12*mm* in diameter. The brown irides showed a dull luster, and their design was not well defined (aplasia or atrophy); they were apparently tremulous (though there was some doubt on this point). The anterior portions of the scleræ were bluish in color, as if they had undergone a process of stretching which permitted the uveal pigment to show through the white tissue.

The patient's family history revealed the fact that she had a near-sighted brother older than herself, there being a sister between them. The brother, like the patient, is undersized for his age and slim. The tension of his eyes was R. 40*mm;* L. 38*mm* Hg. The anterior chambers were unusually deep. The optic nerves were normal. His vision to-day is $\frac{30}{100}$ in each eye. With correction, R. $-4.50\ \frac{30}{20}$, L. $-5\ \frac{30}{20}$. His pupils are normal. The tension now is 27*mm* Hg. The disks are pale and show no cupping. His corneæ are 12.5*mm* in diameter. The irides are straight and markedly tremulous. There are six children in the family, of which these two are the only ones wearing glasses. The family history of the parents shows no consanguinity. The father is a tall, well-built old man. His vision is $\frac{20}{20}$ + in each eye, without glasses. His anterior chambers and pupils are normal. The mother is short and stocky; her vision could not be ascertained. One uncle is said to have lost an eye "during a fever." The Wassermann tests were not made.

The patient, on entering the Clinic October 20, 1917, was given a solution of pilocarpine to be dropped into each eye four times daily. Four days later, October 24, 1917, both

pupils were contracted but still unequal and eccentric. The temporal portion of the left iris was more prominent than the other portions of the iris. The tension was R. 70; L. 60. The fields were concentrically contracted to 10 degrees in both eyes. The nerve heads were cupped and atrophic. There were no posterior staphylomata such as are seen in purely myopic eyes. On the following day the tension in the right eye was reduced to 56*mm* and in the left eye to 50*mm*.

On October 25, 1917, the patient was admitted to the Hospital for observation. Her vision at this time was: R. $\frac{10}{200}$ −8.00 = $\frac{20}{200}$; L. $\frac{10}{100}$ −8.00 = $\frac{20}{100}$. The tension was only slightly reduced. So operation was decided upon.

On November 1, 1917, with the patient under ether anæsthesia, the right eye was trephined. The iris prolapsed and vitreous presented. On November 3d there was a new prolapse of vitreous and about a week later the retina was seen to be detached. During November and December, 1917, the eye grew smaller, with ciliary injection and subnormal tension. The prolapse retracted slowly and the eye continued to shrink. In June, 1918, the operated eye showed a beginning cataract, and renewed irritation. It was enucleated July 11, 1918. Microscopic examination was not made.

The left eye, for a time, had resisted treatment with miotics; its tension remained at about 50*mm* Hg. until toward the middle of December, 1917. Its vision was then, with −12.00 − $\frac{20}{70}$. From the beginning of 1918, while the operated eye was slowly shrinking, the left eye began to improve steadily. Its tension diminished gradually from 50*mm* to 36, 27, 18, 15 and 13*mm*, until now its tension has remained, without the use of any miotics for considerably over a year, at about 13*mm* Hg. The vision of this eye has improved from $\frac{20}{70}$ (with glasses) in December, 1917, to $\frac{20}{30}$ (with −12.00), with −12.00−1.00 axis 90° to $\frac{20}{20}$ + (on a very bright day). The patient states that her vision varies and that she does not see as well on some days as on others. The amplitude of accommodation is 5.5 diopters.

To-day (1921) her vision is not diminished; the field remains at about 10 degrees. The optic nerve shows only partial cupping (Axenfeld (19)), but is atrophic. The condition of the sclera and fundus remains the same as at the time the patient entered the Clinic. The cornea measures about 12*mm* in diameter. The aplastic (or atrophic) iris is not tremulous. In the original record there was some question as to whether or not it was tremulous, and it is still somewhat difficult to decide this point. There is a bulging forward of the pupillary portion of the iris, with retraction of the peripheric portion, as if the lens were pressed against it.

Heine (21) describes a spontaneous iris bombée without posterior synechiæ. The irides were congenitally aplastic. According to his view they were ballooned forward by an excess pressure in the posterior chamber. Similar observations by Ulbreit and Elliot are often cited in the literature. In the Heine case, only a portion of the iris in one eye, probably the aplastic portion, showed ballooning. The original record in our case mentions that the upper temporal portion of the left iris was bulging. At the present time the protrusion of the left iris is even and uniformly symmetrical.

The classification of eyes with hypertension in the young is still unsettled. The clinical picture varies and its different phenomena are understood still less than its manifestations in the adult. Megalocornea and buphthalmos can be rejected in our case, inasmuch as no corneal changes were detected; there is no excessive size of the globe in disproportion with its refraction; there is no progression, no exophthalmos. The palpebral fissure is normal in width. Hence all the typical symptoms of buphthalmos are absent.

As to the relative position of our two patients in the scale of hypertension in the young, the brother, with his somewhat larger corneæ, deep anterior chambers, tremulous irides and absence of cupping of the disk, although older than the sister, seems to lean more toward buphthalmos, while his sister, whose left eye had a narrower chamber, a smaller cornea, and early cupping of the disk, inclines more toward the glaucoma simplex form of the disease, but is still far removed from the early senile form.

In attempting to explain the cause of spontaneous reduction of tension in this case, we believe that inflammation as a causative factor, either in the production or reduction of tension, can be ruled out, for changes due to inflammation would have been permanent. Evidently the avenues for the outlet of the intraocular fluids were blocked but have in some way become free.

We may well assume that Schlemm's canal was always present and is now pervious; a similar assumption may be made as regards the other structures about the filtration angle. Instead of an arrest of development of these structures, there may have been merely a delay until after birth in their complete unfolding. A similar change may take place in other structures of the eye, for Fuchs (24) says of the pupillary membrane that it "is of comparatively frequent occurrence in the new-born infant, but *disappears afterwards*, except in a few cases in which a remnant of it persists during the whole life."

At the present time our patient and her brother both show

a higher refraction than their glasses, when first seen, would indicate. The sister shows 4 diopters; her brother 1 diopter more. However, both of them have come to us under-corrected.

In our patient there was no posterior staphyloma, as is seen in higher myopia; as we have before mentioned, there was cupping of the optic disk. The cornea had not given away to the hypertension, for the anterior chamber was not deep. (It is now shallow.) The force of the pressure manifested itself in another weak area of the structures, enveloping the eyeball, by expanding the intercalary region (bluish sclera). While posterior pressure resulted in a partial destruction (atrophy) of the optic disk, the stretching of the anterior portion of the sclera probably was the means of the eye's salvation. Here some persistent embryonal bands that had blocked or strangled the normally formed outlet tubes may have given away under the increased pressure that they themselves had produced. Reiss (9), Axenfeld (4) and Treacher Collins (17) maintain similar views. Fage (7) mentions that some observers believe that such bands may be torn in some instances by the tug exerted upon them by miotics alone. It is conceivable that a combination of all the forces alluded to may have occurred.

The hypotonus of about 13*mm* Hg., now stationary for over a year, may be normal in a globe whose sclera has lost, by stretching, its power of elastic adaptability to its contents (Heine (12), Lange (13)).

If the eye of this patient is undergoing a slow process of degeneration with hypotonus (Schirmer (28) (29)) the improvement of her vision (with glasses) from $\frac{3}{7}\frac{8}{8}$ to $\frac{3}{5}\frac{9}{8}$ + still would be worthy of note.

In brief this is a report of a spontaneous reduction of hypertension to a state of hypotonus without diminution of vision in an eye suffering from congenital (juvenile) glaucoma. No operation was done in the eye under discussion; only miotics were given. We believe that there was an arrest of development of the structures about the filtration angle that interfered with the normal outlet of the intraocular fluids, and that this drainage system became pervious years after birth, by completion of its development (by unfolding, or by tearing any blocking or strangling impediments during this process of natural growth) or by force of the increasing tension alone. However, a slow process of degeneration with hypotonus cannot be altogether refuted.

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REPORT OF THE PROCEEDINGS OF THE SECTION ON OPHTHALMOLOGY OF THE NEW YORK ACADEMY OF MEDICINE.

By Dr. CONRAD BERENS, Jr., Secretary.

MEETING OF MAY 16, 1921. DR. L. W. CRIGLER, CHAIRMAN.

Dr. George H. Bell showed a patient with **retinitis proliferans** in both eyes. The right eye presented a large shiny white mass in the temporal portion of the retina, from which a thin membrane passed back to the optic nerve, and was attached to it. A large number of blood vessels could be seen projecting from this mass. Both optic disks were hazy, owing to floating vitreous opacities. The patient previously had Hodgkin's disease and is now suffering from anæmia.

Discussion: Dr. Würdemann referred to the occurrence of retinitis proliferans in diabetes.

Dr. George H. Bell showed a patient with a **foreign body in globe,** of fifteen years' duration.

There is a scar on cornea and opacity in the lens. In the clear vitreous a wormlike mass can be seen above and anterior to the disk.

The X-ray reveals a foreign body in its vicinity. As the eye shows no siderosis and is quiet (vision $\frac{20}{70}$) it is advised to leave it alone.

Dr. Ben Witt Key reported a case of **tumor of the hypophysis**.

G. T., age 20, in June, 1920, began to have nausea, dizziness, and headache, and two months later developed diplopia and diminished sight in his left eye.

His family history, previous history, and physical examination were negative.

Ocular examination showed paralysis of his left external rectus, and slight dilatation and sluggishness of his left pupil. The media were clear in each eye, and in each there was a choked disk of 5 or 6 diopters, with enlargement and tortuosity of the veins, and a few small hemorrhages. A few small white patches of chorioretinitis were also present. There was no pigmentation. Vision R. $\frac{1}{8}\frac{0}{0}$, L. $\frac{1}{2}\frac{0}{0}$ unimproved. The fields were slightly contracted concentrically, left greater than right. The urine, blood, and spinal Wassermann were negative. X-ray (Dr. Dixon) showed frontals, ethmoids, and sphenoid cloudy. Sella 157 sq. *mm.*

A diagnosis of brain tumor was made (Dr. Elsberg) and he was given antisyphilitic treatment, under which he rapidly improved, all symptoms disappearing, and left vision improving to $\frac{2}{7}\frac{0}{0}$.

January 17, 1921, X-ray showed sella enlarged to 272 sq. *mm*, with other conditions unchanged.

In spite of his improvement in other respects, there developed during this time the usual symptoms of acromegalia. He is 3¼ inches taller and weighs 45 pounds more than at the beginning of his treatment, and his features, hands, and feet are noticeably enlarged.

Upon leaving off his antisyphilitic treatment only for a short time, his original symptoms returned.

Clinically, Dr. Key regards this case as one which may be classified in the third group outlined by Dr. de Schweinitz in his recent paper (December, 1920), that of "Hypophyseal diseases in subjects in whom the history and seriological tests did not demonstrate syphilis, but in whom anti-luetic treatment was suggestive."

Dr. Key thinks his case was still more suggestive of syphilis because of the sixth nerve paralysis and chorioretinitis.

Dr. KEY presented a patient with **bilateral dacryo-adenitis.**

J. B., age 16, when first examined, had inflammation of both upper lids. Onset sudden. She had had tonsillitis 3 weeks previously and gonorrhœa 3 months previously. There was no other history of importance. Examination showed marked symmetrical œdema of both upper lids; tearing, but no discharge; conjunctiva congested with œdema of Tenon's capsule in upper temporal quadrants; each lacrimal gland was enlarged,

firm and tender. There was limitation of movement outward and upward, with displacement downward and inward. There was no other glandular involvement.

Physical examination was negative except a temperature of 101.5° F. and a mild urethritis when first seen. The X-ray (Dr. Dixon) showed cloudiness of all sinuses.

The condition cleared up in 10 days with rest in bed and ice and 25% argyrol locally.

Dr. Key regards this as a case of lacrimal mumps, on account of the age of the patient, bilateral involvement, absence of suppuration, and short duration.

Dr. CURTIN reported a case of **solitary tubercle of choroid,** occurring in a girl 13 years of age, with a grayish white mass adjacent to the disk with an elevation of 3 D. Vision $\frac{20}{200}$. The subcutaneous tuberculin test gave a moderate reaction and after tuberculin treatment for five months the mass is reduced in size; vision $\frac{20}{70}$, and patient has gained 15 pounds in weight.

Dr. L. W. CRIGLER presented a case of **avulsion of optic nerve.**

H. H., age 17, on March 4, 1921, while playing basketball was struck in his left eye by the finger of one of his fellow players. He was stunned for a few moments, and on recovery found that he did not see with the injured eye. Examination on the following day showed a laceration of the ocular conjunctiva in the lower-outer quadrant, a slight cut in the margin of the lower lid, evidently produced by a sharp finger nail. The pupil was dilated and did not react to light. The eyeball was soft, there was no fundus reflex, the vitreous chamber being filled with blood. He was treated at the Manhattan Eye, Ear, and Throat Hospital and the fundus reflex began to appear about the sixth day. The nerve head could be indistinctly seen as a perfectly white round disk, excavated and devoid of any visible blood vessels. A distinct laceration of the retina and choroid at the margin of the disk was evident by the sudden termination of the retinal circulation around the margin of the disk, cloudy swelling and slight pigmentation of the retina. The peripheral portion of the retina which was evidently devoid of blood immediately after the injury, and hence no longer transparent, had, by the time the fundus was

visible, become transparent and the retinal circulation, by some curious means, partially restored, although there was still no blood in the main trunks internal to the laceration. The lamina cribrosa was ruptured, as evidenced by the deep excavation of the nerve head. There was a brownish black mass at the bottom of the excavation, presumably a blood clot, as it has now disappeared, and the deep cup is gradually filling in with connective tissue. There are large stream-like hemorrhages extending out into the vitreous, so that one appears to be looking at the optic nerve-head as through a funnel.

The unusual feature in this case is the fact that the avulsion was due to direct force applied to the eyeball, whereas in most cases the cause is a penetrating wound of the orbit in which the nerve is torn from the eyeball. Here we have the effect of sudden increased intraocular pressure transmitted to the head of the optic nerve, the lamina giving way, and the retinal fibers being torn from the nerve at the margin of the disk. The dural sheath of the nerve is probably intact.

The first paper was read by Dr. H. V. WÜRDEMANN of Seattle, by invitation, **the mechanism and effect of massage of the eyeball as applied in iritic synechiæ, glaucoma, embolism of the central artery, optic nerve atrophy, and retinitis pigmentosa.**

The author gives briefly his experience with massage in the treatment of embolism of the central retinal artery, the breaking up of adhesions in iritis, reduction of tension in glaucoma, optic nerve atrophy, and retinitis pigmentosa.

The author has been using ocular massage for many years, and has replaced digital massage by instrumental massage with the suction pump apparatus of the Victor machine. A rubber cup massage handle receives its power from the Victor transformer No. 2 and the Pynchon pump attachment. The nipple of the pump should be at a point two thirds distant to the right when we obtain vibrations on alternate compression and suction. The force or gentleness of the stroke is also regulated by thumb pressure over the hole in the handle. Great care should be exerted that neither the length nor the amount of the stroke causes any discomfort. In fact, the slower the stroke the better it is. We obtain the best results with 50 to

150 vibrations per minute. With the transformer and pump attachment the length of the stroke varies from 0 to 1¼ inches and the length of the stroke desired can be selected by a gauge attached to the crank pin. The rapidity of the piston stroke varies from 30 to 600 vibrations per minute. Suction and release with as long a movement of the piston as possible, in order to pull the eye in and out of its socket as far as possible, gives the best results. The suction and release are used for about one half minute, the eye looked at, and if no evidence of hemorrhage in the anterior chamber can be found, used again for about a minute, and further treatment according to the condition present.

There have never been any evil results, even when hyphæma has occurred.

DISCUSSION: Colonel HENRY SMITH said that he had no experience with this form of treatment, but believes that Dr. Würdemann has made a valuable contribution if future investigation bears out the truth of his statements.

Dr. ALEXANDER DUANE has not used mechanical, but has used digital massage in embolism of the central artery. He thought, however, that he had derived more help from the inhalation of amyl nitrate in a case of recent embolism. He is skeptical of the value of mechanical massage in retinitis pigmentosa. In neuritic atrophy he believes it might possibly help.

Dr. CLAIBORNE thought that the method described by Dr. Würdemann should be given a trial.

Dr. Würdemann in closing said he had seen beneficial results from the use of mechanical massage in 35 cases of embolism of the central retinal artery. Thirty cases of neuritic atrophy have been reported in the literature as benefited by massage. He is certain that recent posterior synechia can be broken by mechanical massage, and that massage produces permanent enlargement of the blood vessels of the eyeball.

Col. HENRY SMITH of England read the second paper of the evening, entitled **brief notes on some ophthalmological conditions** (appears on page 422 of this issue).

DISCUSSION: Dr. ARNOLD KNAPP was very much impressed with the necessity of a large section in congenital cataract to which Col. Smith had referred. In fact, in all microphthalmic

eyes, it is desirable to make a definitely scleral section. Col. Smith's method of making an artificial pupil was very interesting and that the incision in the cornea must be at exactly right angles was important, so as to produce as little scar as possible. Col. Smith's method of controlling the eyelids during a cataract operation was an important contribution to the technique of cataract extraction, which has been accepted by many, even those who are not advocates of the intracapsular operation. Dr. Knapp was very much interested in hearing of Col. Smith's experiments in paralyzing the orbicularis and hoped that this method would soon be perfected. Until an anæsthetic is found which after injection will paralyze the orbicularis for one week, it will be necessary to use general anæsthesia in intractible patients and in this connection he would ask Colonel Smith to give his experience in cataract extraction under general anæsthesia.

Dr. WÜRDEMANN said that he was indebted to Col. Smith for his technique of raising the eyelid so the patient may look up during the cataract extraction. He prefers a subconjunctival incision in all eye operations. He suggested that we paralyze our patients instead of paralyzing the orbicularis. He uses $\frac{1}{100}$ of a grain of hyoscin and ¼ of a grain of morphine hypodermatically and he stated that frequently patients do not know they have been operated upon until the next day. He loses less vitreous than he did formerly although even now he confesses that he loses vitreous in 8% of extractions.

Dr. CLAIBORNE said that for years he has used Skeel's speculum, and has the assistant press down on the heel of the speculum throughout the operation. This pulls the lid forward, which is necessary, in the opinion of Col. Smith. He believes that if this method is used it will be as easy to express the lens in the capsule as by Smith's method. Dr. Claiborne said we must finally come to some method of extracting the lens in the capsule. He believed the old method was soon to become obsolete, and the extraction in the capsule was the only reasonable procedure. At the present time, however, extraction in the capsule seems to be narrowed down to two methods, the removal of the lens by the Indian method or some modification of it, and the method of suction, recently advanced by Barraquer. Dr. McDannald of this city has invented an

instrument, clever and simple in its construction, for the suction operation.

Dr. MEDING said the most practical suggestion Col. Smith has given is his method of making an iridectomy, but to be successful we must follow his instructions carefully. The corneal incision must be at right angles to a line drawn through the center of the proposed pupil. It must also be without the new pupil's circumference and at least 5*mm* in length.

It is curious to hear objections against the necessity of an assistant in the cataract operation. How strange it would sound were general surgeons heard to decry any technique because it demanded the trained assistant. A very important matter in the management of the upper lid is that it be lifted forward and downward and never painfully.

Col. Smith, in closing the discussion, said he had not seen iritis adhesion in congenital cataract cases. He frequently puts patients sufficiently under chloroform to make them at ease and use cocaine to stop pain. Dr. Würdemann has made a suggestion with regard to hyoscin which may be of service, but he never uses it in general anæsthesia, for it is a dangerous drug. He does not use morphine for patients who have a tendency to vomit. He now uses bromides—120 grains for a man and 100 grains for a woman, 8 or 10 hours before the operation. The patient sleeps well for the next three nights. Sixty grains will make the patient more irritable and he assures us that the larger dose is quite safe. He went to Spain to see Dr. Barraquer operate with his instrument and he believes it is a good instrument and that Dr. Barraquer operates with it successfully. In mature senile cataract it will be successful. In Morgagnian cataract it will only remove the anterior capsule and he believes we will have to resort to his method if we wish to remove Morgagnian cataracts in capsule. He believes that the Bunsen pump will act as well as a special pump in the suction operation. Col. Smith asked, is it to the interest of the patient to do a cataract operation with just the fingers and the knife? Anyone can do this, but we never know how our patients will behave and we should be prepared for every emergency.

REPORT OF THE ANNUAL CONGRESS OF THE OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

By Mr. H. DICKINSON, London.

The annual Congress of the Society was held in London on May 5th, 6th, and 7th, under the presidency of Mr. J. Herbert Fisher, F. R. C. S. The arrangements included the reading and discussion of papers, holding set debates, the delivery of the Bowman Lecture (by Mr. Treacher Collins), a clinical meeting (at St. Thomas's Hospital), a museum of exhibits and instruments and apparatus, and a dinner. It was a marked success, the attendances being well maintained at all the meetings.

President's Address: "The Personal Equation."

The President, in the course of his opening address, after expressing his appreciation of the high honor conferred on him by his election to the chair, said the complete ophthalmologist did not, indeed could not, exist. If perfection were attained, then there would be nothing more for which to strive, no further incentive to effort. The subject was wide as the heavens, deep as the ocean; to comprehend ophthalmic science as it now exists its devotees must perforce enlist as allies the mathematician, the physicist, the chemist, the physiologist, the anatomist, the physician, the surgeon, the urologist, the radiologist, the pathologist, the bacteriologist. Within the ambit of ophthalmology there was room for every man to exploit to the full the gifts and inclinations with which he had been endowed. Perimetry and the examination of the central

field for color defects, absolute and relative scotomata, were playing a larger part in eye investigations, and it behooved them to remember the personal equation when employing these methods, if right value was to be attached to their results. One investigator's charts would rarely be found to coincide with those of another on the same subject being examined. Only when a surgeon had stereotyped his own personal equation and controlled that of his patient would his results on the same case on successive dates be reliable for clinical purposes. Tonometry was tending to replace digital estimation of intraocular pressure, and it was for the younger ophthalmologists to explore its value. Not yet, however, would it quench the older method. Every means should be taken to keep clear of error. The indication for or against operation in a case of chronic glaucoma would never be determined by such variables as the readings on a tonometer, or the shape or fluctuations of the blind spot, though these observations should be a useful supplement to the well-trained clinician. In ophthalmology, the symptoms narrated by the patient were ambiguous, the chief signs were precise. Too often the ophthalmologist was confronted with the highly myopic sempstress or clerk, incapacitated in the later years of working life by failing vision. A little guidance given to the progressive myope about to embark on the serious business of life—a suggestion as to suitable employment—might save such an one from a life of misery, ending in shipwreck. Compared with such help, the most perfect retinoscopy was of little value. In no other organ of the body than the eye was it given to the clinician to view the pathological process in actual progress, and the ophthalmologist was proud to be called in by his colleagues to clinch, by his objective methods, the suspicions of grave local or general disorder. He could give much help to the neurologist in cases of hemianopia by the presence or absence of Wernicke's sign or pupillary reaction.

He proceeded to advocate a closer working coöperation with colleagues in general medicine and surgery; the gain would be mutual. But the ophthalmologist must keep his own house in order. The pupil must be taught to realize that in dealing with his patients he had responsibilities which he could transfer to no one else. Laboratory investigations might supplement

his own work, but they were no substitute for it, and he must be trained to stand erect by himself. The study of disease in the eye could be undertaken only by those who had been trained in every branch of medicine and surgery: on this there could be no compromise. Ametropia and its results could not be surrendered to the optician. Physiological working, not visual acuity, was the goal of the refractionist. $\frac{6}{6}$ vision was not proof that the most serious—or indeed any—disease of the eye was not present. Mr. Fisher concluded with a sympathetic appreciation of the work of two recently deceased members of the Society, Mr. Charles Higgens, and Mr. H. E. Juler.

On the motion of Sir ANDERSON CRITCHETT, the President was cordially thanked for his address.

Mr. MAITLAND RAMSAY (Glasgow) read a paper on a case of **cyclitis associated with swelling of the parotid glands, and paralysis of cranial nerves.** The patient, an unmarried lady of 31, had had enlarged cervical glands removed at 6 years of age. After family trouble and hard work she awoke one morning with her lower eyelids puffy and her ankles swollen. No abnormality was discovered in the urinary, circulatory, respiratory, or digestive systems. Swelling increased, and extended to the knees, and the skin of the chest was hyperæsthetic, accompanied with intercostal pain. After ten days in bed the œdema of ankles disappeared, but not the intercostal pain. Even large doses of aspirin only gave temporary relief. In the third week the left parotid gland began to enlarge, and the right a week later. A fortnight later the sight of the right eye became dim, and a similar condition came on in its fellow five days later; the eyes readily watered on exposure to light. The sight became very dim, and there was pericorneal injection with numerous spots on the posterior surface of the cornea, discoloration of the iris, irregularity of pupil, and a deep anterior chamber, but the intraocular tension was not increased. The visual acuity was, R. $\frac{6}{12}$, L. $\frac{6}{18}$. A week or two later there was sudden paralysis of the left facial nerve. Failure of vision was now rapid, and in a few days she could scarcely distinguish a hand held between her eyes, and she had a throat condition which interfered with swallowing; the soft palate was seen to be paralyzed. At this stage improvement set in, coincidently

with the administration of thyroid extract, on the assumption that the condition was a deficiency disease. She got well. Neither mumps nor diphtheria could be considered as causal factors.

Mr. J. GRAY CLEGG (Manchester) read a paper on **partial monocular lamellar cataract associated with persistent pupillary membrane and birth injury.** Dr. Gordon Renwick co-operated with him. He showed and demonstrated the slides by the epidiascope, and raised the question whether the birth injury had anything to do with the association of partial lamellar cataract with persistent pupillary membrane. He referred to Treacher Collins's work on the subject.

Mr. G. F. ALEXANDER read two papers. The first was on the **influence of age on the power of the crystalline lens.** He said the prevailing teaching inferred that in the lens there were surfaces acting as concave refracting surfaces, and that the increase in the index of the cortex was, by increasing their power, the cause of the diminution of the power of the lens as age advanced. The author, however, contended that there are no such surfaces in the lens. In regard to refraction, a spherical surface separating two media of different index was convex if its center is on the side of the one of greater index, and concave if it is on the side of the one with less index. And as in the lens and its nucleus the more central the lamellæ were the higher were their indices, the center of their curvature must lie on the side of the medium of greater index. Hence the surface separating the cortex and nucleus is a convex and not a concave one; and a ray incident on either surface of the lens encounters in its transit through it a series of convex refracting surfaces, and at no part of its surface a concave one. He contended, secondly, that the cause of the diminution of the power of the lens as age advances is the diminution in the convexity of its surfaces and those of the nucleus from their growth. He showed that the radius of the surface of the lens is greater than that of the surface of the nucleus. The only factor tending to diminish the power of the lens as age advances is the increase in the radii of its surface and those of the nucleus accompanying their growth.

Mr. ALEXANDER read a paper also on the **estimation of torsion or near vision.**

A Court Quack.

Mr. R. RUTSON JAMES read a paper entitled **Sir William Read, Oculist to Queen Anne and to George I: Quack, Mountebank.** It was an exposure of extravagant claims to medical and surgical skill on the slenderest foundation, and a narration of the material success achieved.

Mr. D. J. WOOD (of Cape Town) sent two papers, which were read. The first was entitled **two cases of flat neoplasm of the choroid.** The first of the patients, a man aged 27, complained that during the last six weeks he had lost the sight of his left eye. There was a widely dilated pupil, unusual redness of the outer part of the sclerotic, and a detachment of retina close to the back of the lens. A colleague had discovered disease in the left antrum and in the back part of the lower jaw. Glands on the right side of the neck were enlarged. A portion of one which was taken away was supposed to be epitheliomatous. X-rays produced improvement. It was evident, however, that there was an intraocular tumor, as the iris began to bulge forward on the outer side. The eye was therefore excised, and there was found a typical flat sarcoma extending from the optic nerve forward to the iris, with complete detachment of retina. The growth was everywhere in contact with the sclerotic, and infiltrated it; and it extended up to, without involving, the optic nerve.

The second patient was a Jew, aged 40, whose left eye was glaucomatous. The eye was blind, the cornea steamy, the pupil dilated, and there was an area of redness on the outer part of the sclerotic. The eye was excised. The tumor occupied the whole of the lower half of the fundus, and was a flat growth with a complete retinal detachment. It had begun close to the optic nerve, and extended forward to about the ora serrata. It was spindle-celled. Mr. Treacher Collins had examined the specimen, and considered it was of the epithelial type, the cells being arranged in alveolar fashion; he thought it was probably a secondary carcinoma of the choroid. A section from the glands in the neck showed an epitheliomatous growth.

Mr. WOOD also sent a paper on a case of **symmetrical encroachment of the conjunctivæ on the corneal margins.** The

patient, a somewhat old man, had been treated for cellulitis at the root of the nose, and pus was evacuated from the lids of the eye. The corneal margin was found to be covered by a ring of conjunctiva from 2 to 2½*mm* wide, and the conjunctival vessels were continued into it. With a fine probe the conjunctiva could be separated from the cornea.

The Psychology of Vision in Health and Disease.

Thursday afternoon was reserved to a discussion on this subject.

Professor C. SPEARMAN, Ph.D., introduced the debate. He said we see objects in different places, and the question of the source of this power was one of the most difficult in psychology. Generally, the authorities had been divided into two antagonistic camps. The first consisted of the empiricists, who regarded visual place as the outcome of experience, arising through some such process as "association" or "fusion." On the other side were the "nativists," for the most part physiologists such as Galen and Johannes Müller, who maintained that the power was essentially innate. According to them, the apparent situation of any particle was "specific energy" of the particular nerve fiber stimulated. This camp had also brought forward a strong array of evidence, and claimed that pathological cases favored their view. There was no longer reasonable doubt that our spatial perception was, at any rate partly, determined by factors of a hereditary character. If the origin was to be sought in experience, it must be in some degree that of our ancestors. Wheatstone made a serious breach in the extreme nativist theory when he showed that the pair of images thrown on the two retinæ by any visible particle did not, in general, fall on "corresponding" points of the retinæ; it was, in fact, their very deviation from "correspondence" that furnished our chief criterion of distance and depth. A pair of images, he showed, though thus falling on non-corresponding points, could, nevertheless, be seen as a single image. Straub concluded that the binocular perception of distance must be merely derivative from the far older uniocular perception of it. Professor Spearman showed that two retinal points, although truly "corresponding" and normally producing the same visual

situation, engendered, under certain circumstances, different visual situations; in fact the spectacle might be presented of an object moving backwards and forwards although, all the time, the place of retinal stimulation remained unchanged. He leaned still more to the empiricist school than to the nativist.

Mr. J. H. PARSONS, F. R. S., read an exhaustive paper on the **evolution of visual perceptions, with special reference to the rôle of suppression.** It is difficult to give an adequate idea of the contribution in a short précis. He was followed by Sir ROBERT ARMSTRONG-JONES, the psychologist, who spoke of an acute melancholiac being restored to mental health by having her refractive error relieved by glasses. He referred also to the relief produced on mental patients by appropriate color-schemes.

Dr. S. A. KINNIER WILSON read a paper on **psychological peculiarities in certain visual auras in epilepsy.** He related cases of idiopathic epilepsy which were distinguished by a mental state presenting curious psychological characteristics of its own. He recalled that Dr. Hughlings Jackson had directed attention to this condition, and used several terms to describe the occurrences, one of which was a "voluminous mental state." Dr. Wilson said there were two distinct types which should interest the ophthalmologist. The first was the *déjà vu*, or the "familiarity" type, and its converse the strangeness type (in which surroundings and conditions either seemed very familiar or unaccountably strange); and the second was the "visual memory" type. He gave examples of both from his own experience.

Dr. A. S. PERCIVAL said a sensory impulse may not affect consciousness, and yet a coördinated movement in response to that stimulus may result. The psychology of vision really meant, he said, an enquiry as to how a physical or chemical change in certain nerve cells could give rise to a consciousness or sensation of light.

Mr. FRANK JULER read a paper entitled **amblyopia from disuse: visual acuity after traumatic cataract in children.** He said he had thought that more light might be thrown on this subject by evidence which gave more exact definition or determination of dates of onset than was obtained from ordinary strabismus cases. He thought that in certain cases of

injury to the lens in young children a line of evidence might be obtained which would satisfy the disputators, and perhaps decide whether amblyopia from disuse exists or not. In most cases of traumatic cataract, he said, the opacity was rapid, and little light reached the retina after the injury. In some of his cases the lens matter had been evacuated soon afterwards, leaving only an opaque membrane, while in a few an artificial pupil had been made not much later. Even in cases where an artificial pupil had been made, the deviation of images by the aphakic hypermetropia must be so great that the retinal impulses could not compete with or assist those transmitted from the retina of the sound eye, and one would expect these impulses to be neglected, with the consequent development of amblyopia from disuse, if such disease exists. The latter should still more certainly develop if an opaque lens or membrane blocked the light path for some considerable period. He had been able to trace a certain number of the juvenile traumatic cataracts recorded in the Moorfields Hospital notes from 1910-17, to see them personally, in many cases to form a new pupil, and finally himself examine the vision, fundus, and other points in every case quoted. He found a striking line of difference between the final visual results, depending on the age at which the lens became opaque. None of the eyes which became cataractous before the age of 5 had retained a final central acuity of vision of $\frac{6}{60}$. The series gave evidence that there is such a disease as amblyopia from disuse; that it affected the eyes of children up to 6 years, that it did not attack eyes after the age of 7 years, that it was not merely a standing still of the development of the retina or certain cerebral associations, but that it caused a real retrogression of the effective power of the retinal impulse on the consciousness after the macula had reached an age at which a central vision of $\frac{6}{6}$ was normally present. The existence of amblyopia from disuse as the result of concomitant squint had been the subject of dispute among ophthalmologists for the last fifty years.

Mr. E. Treacher Collins then delivered the Bowman Lecture, taking as his subject **"changes in the visual organs correlated with the adoption of arboreal life and the assumption of the erect posture."** He was cordially thanked for the lecture.

Friday morning was devoted to a discussion on **the treatment of manifest concomitant strabismus.**

Mr. CLAUD WORTH, in opening the debate, said the matters to be considered in the treatment of convergent squint were: (1) the prevention or cure of amblyopia ex anopsia; (2) the correction of refractive error; (3) fusion training, and (4) operation. If a constant unilateral squint had lasted a considerable proportion of the child's life, in the absence of efficient treatment the deviating eye would be found to be more or less blind. Probably no one now doubted that the amblyopia was almost invariably acquired from disuse; and the loss of sight was more rapid the younger the child. One who began to squint constantly at the age of one year might lose central fixation in three to four months. The child must be forced to use the deviating eye; that was far more important than all the rest of the treatment of squint. In a recent squint, to cure low degrees of amblyopia, or prevent it, the fixing eye should be kept under atropine until it became the deviating eye. The child should then be seen again after the effect of the atropine had passed off. After this, the deviation must be kept alternating, one or other eye being atropinized occasionally if necessary. If central fixation in the deviating eye was absent or unsteady, the atropine treatment was not sufficient. Then the fixing eye should be continuously occluded; intermittent bandaging was of little use.

With regard to correction of refractive error, no child was too young to wear glasses if they were required. As to fusion training, there were certain principles which must apply to all methods. The child must be young, preferably under 6 years of age, and the sight of the deviating eye must be good. A device should be used for throwing pictures simultaneously upon the macular region of each eye. The most difficult step was to overcome the suppression. A good way was by unequal illumination of the object slides in whatever instrument was being used, and the interest of the patient must be maintained during each lesson. The object of fusion training was not to correct the deviation, except in small degrees, but to enable the patient to see binocularly when the visual axes shall have been restored to approximately their normal relative directions.

With regard to operation, if measurements showed that the

angle of deviation was increasing or was not decreasing operation became necessary. If there was no hope of binocular vision, he did not, usually, operate until the 7th or 8th year of age. Formerly, he frequently performed tenotomy of the internal rectus in combination with advancement of the externus in high degrees of convergent squint, but this practice was finally abandoned by him in 1905. Many of these cases had been followed by divergence long afterwards. For many years he had been relying on advancement alone, and, except in very small deviations, both externi were advanced. He proceeded to enter into the minutiæ of technique, concluding with the remark that there were practically unavoidable failures in squint operations; the result attained was a measure of the skill and experience of the surgeon, who should be prepared to accept the responsibility for it.

Mr. A. J. BALLANTYNE made a contribution in which he dealt with his own experience of concomitant convergent squint. In every case the first procedure should be an estimation of the refraction and the prescription of suitable glasses for constant wear. If there was merely a low degree of hypermetropic astigmatism, one would not expect glasses to influence the squint, and the wearing of glasses would be postponed until 2 years of age. In many the wearing of glasses, with training if necessary, was all that was needed. Practically all his cases were aged 7 years or under, and the largest squint he had corrected was 40°, the patient being 18 months old, and the squint of two weeks' duration; in most of the cases the angle was 15° or less. If one eye was amblyopic, an attempt should be made to train it. In most cases, he thought, the amblyopia was the result of the squint. He applied atropine more or less continuously to the sound eye. He was inclined now to operate at an earlier age than formerly was thought desirable. Advancement alone sufficed in many cases; he had never seen permanent over-correction result from advancement or muscle-folding, therefore he would not hesitate to operate at any age. Worth's operation could be depended on to correct 20° or 25° of convergence. The muscle-folding operation gave about half this effect. He rarely did tenotomy of the internal rectus, and he objected to combining tenotomy with advancement at one operation in a patient under 16 years. If tenotomy were

done in children, it should be of the nature of a last resort. Strabismus operations might be very disappointing in excitable and nervous children. Failure in operation was in some cases due not to slipping of the stitches, but to looking to a remedy of a mechanical kind for an error which was functional. His results from amblyoscopic fusion training had been disappointing. The varied pathogenesis of concomitant strabismus made it evident that the same treatment would not be suitable in every case.

Mr. M. S. MAYOU said that if a patient had good vision in both eyes and there was some attempt at fusion, he operated as early as possible, provided the patient had worn glasses a year without improvement. For convergent strabismus up to 15° he did tenotomy of the internal rectus, but in young children as much as 20° could sometimes be corrected by it. For convergent squints of 15° to 45° he did a tenectomy associated with tenotomy; he preferred a shortening of the tendon and using the stump of the muscle attached to the globe for holding the sutures.

Mr. N. BISHOP HARMAN said the factors responsible for squint could be grouped under three heads: (1) defects of the eyes; (2) defects of the muscles; (3) toxic influences, in the widest meaning of that term. Among 368 infants in a higher grade school, only 8 had emmetropic eyes, many had errors of refraction, mainly hypermetropia, and in 126 the errors were of considerable or even high degree. Yet among all those children there were only 8 squinters. The most influential factor in squint he considered to be defective balance of the muscles. His favorite method of operating was shortening of one muscle by subconjunctival reefing with lengthening of the antagonist by tenoplasty.

At the evening meeting the following papers were read:

Lieut.-Col. H. HERBERT: **a justification of the wide iris-prolapse operation for glaucoma.**

Mr. T. HARRISON BUTLER: **on the rational treatment of glaucoma.**

Mr. C. GOULDEN and Mr. M. H. WHITING: **implantation cyst of the sclera following an operation for squint.**

Sir WILLIAM LISTER: (a) **some intraocular epithelial cysts;** (b) **punctate deposits in the retina.**

Mr. P. G. DOYNE: **some observations with the scotometer.**

On Saturday morning there were further papers, as under:

Sir ARNOLD LAWSON: **a case of orbital tumor (neuroma).**

Mr. HAROLD GRIMSDALE: **a note on the mechanism of the equilibrium of the globe.**

Mr. E. H. STACK and Dr. GEORGE MACKAY exhibited motor trephines, and Mr. A. W. ORMOND read a paper on **extraction of cataract by suction.**

REPORT OF THE TRANSACTIONS OF THE OPHTHALMOLOGICAL SECTION OF THE ROYAL SOCIETY OF MEDICINE.

By Mr. H. Dickinson, London.

A clinical meeting of the Section was held on June 10th, with Mr. W. T. Holmes Spicer occupying the chair.

A Speculum to Prevent Pressure on Globe.

Dr. Wallace Henry demonstrated a speculum which he had devised for the purpose of preventing a patient pressing his eyelids together after an opening had been made surgically. He said that since he started using it, at the beginning of the year, he had had no loss of vitreous. He was accustomed to leave the speculum in position until the lens extraction and the toilet was finished.

It had a favorable reception.

A Desk for Myopic Children.

Mr. Frank Moxon showed a desk for use with myopic children or those who, on account of the close application of the eyes to the task in hand, were liable to become myopic. The eyes were kept at a minimum distance by means of plate glass, under which the child did his writing.

Cases of Macular Disease.

A number of cases of macular disease were shown and discussed: Mr. Rayner D. Batten: Two cases of acute macular disease; Mr. McMullen: Changes in the fundi in three brothers; Mr. G. W. Roll: Case showing macular changes.

Mr. BATTEN spoke of the desirability of a better knowledge of diseases of the macula; cases frequently occurred in which macular changes were the only evidence of disease and the cause of failure of sight, unassociated with other forms of retinitis. There was a great discrepancy between the physical signs, as shown by the ophthalmoscope, and the symptoms. Much depended, for a recognition of the physical changes in the macula, on the light. When a really efficient light was available, fine pigment changes which now escaped observation would be detected. Finer changes in the macula could be better seen by looking to one side rather than straight at the macula. The two acute cases he now showed were not unlike the family group in respect to the fundus changes; this familial group must be kept in view in investigating macular changes, otherwise the explanation of the fundus change might be missed. Familial amaurotic idiocy was allied to that which was racial in origin, and both forms might be due to the same toxin. The nature of the toxin was not yet known; in his cases causes at work included pyorrhœa, suppuration of nasal sinuses, gonorrhœa, influenza, and other illnesses, and pregnancy.

Mr. MCMULLEN'S three brother cases all had fundus changes of different character, but having one feature in common, viz., the development of abnormal connective tissue, either on the surface of the retina or the vitreous. Of the possible causes, he favored the view that they followed intraocular hemorrhages. He regarded the cases, in fact, as atypical retinitis proliferans. These three brothers were members of a family of 13 children—9 boys, 4 girls. Three of the boys died early in life, i.e., between 2½ and 5 years of age, and of the 6 surviving boys 4 had defective sight.

Mr. ROLL'S case had a circular plaque of what seemed to be organized fibrous tissue of the macula, the changes being symmetrical in each eye. Sight failure had been complained of 7 years, especially during the last two years. The field of vision for white and red was practically normal, but yellow and green were scarcely perceived at all. The only history which at all pointed to traumatism was proximity to a falling bomb. The appearance was not unlike that in the Tay-Sachs cases, though these latter were confined to infants, and to the Jewish

race. In one eye there was a hole through the plaque of fibrous tissue.

Mr. HERBERT FISHER, discussing the foregoing cases, thought such a mass of organized fibrous tissue could only have been produced by some lesion, presumably toxic, of an irritative character. He did not know whether there was antecedent hemorrhage. He did not think there was a resemblance to the Tay-Sachs disease in Mr. Roll's case. He agreed with Mr. McMullen's view of the cases that gentleman showed. The macula might show an extreme vulnerability to toxic causes, and in some of the cases there might be macular change having such an origin without peripheral change, though in some there was choroidoretinitis.

Mr. R. R. CRUISE mentioned a case similar to Mr. Roll's, which had been under his observation ten years. The condition began with a quiet-looking œdema of the macula, and went on to a state very similar to that in the present case. The sight was less than $\frac{6}{10}$, and a similar process developed in the other eye. There was first a slight stippling of the macula, then œdema, and later a pale-looking area developed, and that was now quite pigmented over. If first seen now it would give the impression of owning a hæmatogenous origin. He believed cicatrization had now set in. There was some likelihood of the patient being tuberculous; there was no more definite toxic history. He had had two similar cases in private practice since the war, and from them Mr. Matthews obtained the dysentery bacillus and the para-typhoid. They improved very much on treatment with vaccine.

Miss MANN showed an atrophic iris in a patient, the affected area being a sector which went up and out and down and in. At 3 weeks of age the child had smallpox, and blindness had existed in that eye as long as could be remembered.

Mr. J. H. PARSONS, F. R. S., commented on the occasional absence of uveal pigment from the iris which was not revealed by ordinary examinations, hence it might occur more frequently than was usually supposed.

Mr. M. S. MAYOU showed a patient with an unusually large cyst of Moll's gland.

REPORT ON THE PROGRESS OF OPHTHALMOLOGY.

Abstracts by Drs. A. N. ALLING, New Haven; M. J. SCHOENBERG, New York; T. H. BUTLER, London; P. J. DOYNE, London; and K. WESSELY (*Archiv für Augenheilkunde*), Würzburg.

Edited by MATTHIAS LANCKTON FOSTER, M. D., F. A. C. S., New Rochelle, N. Y.

(*Continued from July number.*)

XI.—THE PUPILS.

108. BOTTERI. **A case of polycoria.** *Klin. Monatsbl. f. Augenh.*, lxiv.
109. DUJARDIN, B. and RASQUIN, E. **Syphilis and irregularity of the pupils.** *Annales d'oculistique*, clvi., 2.
110. FLEISCHER, B. and NIENHOLD, E. **Traumatic reflex immobility of the pupils.** *Klin. Monatsbl. f. Augenheilkunde*, lxiv.
111. LANDOLT, M. **Suggestions on the methodical examination of the pupils.** *American Journal of Ophthalmology*, February, 1920.
112. WODAK. **A vestibular reflex of the pupils.** *Muenchener med. Wochenschrift*, 1920, 1.

BOTTERI (108, **Polycoria**) reports a case of bilateral polycoria met with in a man 26 years old, who had dolichocephalus, but no other abnormalities. There were two pupillary apertures in the right iris, three in the left.

DUJARDIN and RASQUIN (109, **Syphilis and irregularity of the pupils**) have made clinical and serological examinations of 265 patients with irregular pupils and found syphilis present in 70 per cent. In some of these patients the irregular pupil was the only manifestation of syphilis.

SCHOENBERG.

FLEISCHER and NIENHOLD (110, **Traumatic reflex immobility of the pupils**) report a case of incomplete, absolute, monolateral immobility of the pupil, characterized by almost complete

absence of the direct reaction to light, better preservation of the consensual, and simultaneous impairment of the accommodation, met with in a child 4 years old who had been struck by a fork in the lower lid. They have not been able to find that a single case of bilateral reflex immobility of the pupils as caused by trauma has been published which corresponds exactly with that produced by tabes or paralysis.

LANDOLT (111, **Methodical examination of the pupils**) emphasizes the importance of a more exact study of the pupil. He makes his examinations under uniform conditions using a frosted light which can be placed at varying distances from the eye. He employs grafts to record the observations made under the varying condition and at different times. He predicts many interesting and new results which are to be expected from a wide application of these methods.

ALLING.

WODAK (112, **Vestibular reflex of the pupils**) observed during the caloric and rotatory testing of the vestibular apparatus a distinct dilatation of the pupils, which lasted from one to thirty seconds. He found this in 170 persons with normal ears, in deaf mutes, in dementia præcox, and in persons with pupils immobile to light. He claims that it has never before been described, and gives it the name of vestibular pupillary reflex. It is caused, in his opinion, by irritation of the sympathetic.

XII.—THE UVEAL TRACT AND SYMPATHETIC OPHTHALMIA.

113. CONNER, A. B. **Congenital choroideremia.** *American Journal of Ophthalmology*, August, 1919.

114. COOKE, C. T. **Rôle of focal infection in sympathetic ophthalmia.** *Ibid.*, January, 1920.

115. DENNIS, D. N. **Apparent sympathetic ophthalmia nine months after enucleation with implantation of gold ball in Tenon's capsule.** *Ibid.*, July, 1920.

116. DOR, L. **A case of sympathetic ophthalmia cured without enucleation.** *La clinique ophtalmologique*, viii., 1.

117. FUCHS, E. **Superficial proliferation of the ciliary epithelium, with remarks concerning ectopia of the lens.** *Klin. Monatsbl. f. Augenheilk.*, lxiv., 1920.

118. GINSBERG. **Chronic iridocyclitis with true lymph follicles in the ciliary body and iris.** *Ibid.*, lxiv., 1920.

119. GOULDEN. **The treatment of prolapse of the iris following acci-**

dental wounds, with a note on removal of non-magnetic foreign bodies from the anterior chamber. *British Journal of Ophthalmology*, May, 1920.

120. JACKSON, EDWARD. **Pseudotumors of the uveal tract.** *American Journal of Ophthalmology*, June, 1920.

121. KNAPP, A. **The autotoxic factor in sympathetic ophthalmia.** *Journal A. M. A.*, June 28, 1919.

122. LEMBERG. **Uveal sarcoma.** *Inaug. Diss.*, Giessen, 1919.

123. LINDNER. **A peculiar case of metastatic ophthalmia, with remarks concerning striated corneal opacities.** *Klin. Monatsbl. f. Augenheilk.*, lxiv., p. 217.

124. VELHAGEN. **Two choroidal sarcomas in one eyeball.** *Ibid.*, lxiv., p. 252.

An 11 year old boy with congenital myopia and ectopia of the lens in the right eye, and congenital myopia in an enlarged left eye, was struck in his left eye by a stone, and later by a fist. FUCHS (117, **Superficial proliferation of the ciliary epithelium, with remarks concerning ectopia of the lens**) found the lens luxated, the retina detached, and a proliferation of the ciliary epithelium from the end of a piece of the detached retina connected with the pars ciliaris. This newly formed epithelium lay on the surface of the vitreous and enveloped the lens, lying directly on the capsule. It was deeply pigmented. In the pathogenesis both of the injuries and the congenital conditions have to be taken into account.

GINSBERG (118, **Chronic iridocyclitis with true lymph follicles in the ciliary body and iris**) found in the eye of an elderly syphilitic a chronic iridocyclitis without caseation, gumma formation, giant cells, or special vascularity. In the ciliary body he found typical lymph follicles with well-formed germinal centers. Hitherto these have been found in only a few cases in organs which contain no adenoid tissue, and not before in the eye. This finding proves at any rate that it is not necessary for adenoid tissue to preëxist in order to have formed nodules of lymphocytes with germinal centers.

From a large experience of such injuries, acquired in France during the war, GOULDEN (119, **The treatment of prolapse of the iris following accidental wounds with a note on the removal of non-magnetic foreign bodies from the anterior chamber**) has some interesting observations to make as regards their treatment. He does not recommend that any attempt should

be made to replace the iris prolapse on account of the probable introduction of sepsis and on account of extreme likelihood of a recurrence of the prolapse.

He lays great stress on the importance of not only removing the piece of prolapsed iris but of thoroughly removing all uveal tissue from the wound. In tangential wounds of the cornea he points out the difficulty often experienced in clearing the wound of uveal tissue, especially that portion of the iris which lies under the lower lip of the valve-shaped wound. He advises that a small keratome incision, 3 millimeters within the limbus, should be made on the side of the cornea opposite to the wound; that the prolapse should then be dealt with; and that finally a repositor should be entered by the original keratome incision and by this means the wound will be more easily cleared of iris tissue.

In wounds involving the cornea and sclera he advises that the conjunctiva should be dissected up freely in all directions from the wound and after dealing with any prolapsed tissue should be sutured securely over the wound; he does not advise scleral sutures.

He is a strong advocate of a conjunctival covering to all wounds where practical, and prefers that the conjunctiva should be freed at the limbus and if necessary undercut and then gathered up with a pursestring suture or by sutures passing over the cornea to the opposite side.

With regard to those cases in which a non-magnetic foreign body is situated in the angle of the anterior chamber, difficulty may be experienced in reaching the foreign body owing to the fact that the incision at the limbus is not on the same plane as the iris and consequently the points of the forceps cannot be sufficiently depressed to grasp the foreign body securely.

In these cases he advises that a keratome incision be made in the cornea halfway between the center and the limbus in the quadrant of the cornea lying over the foreign body and that the point of the keratome be directed towards the foreign body. By this procedure the foreign body can be easily seized in forceps and withdrawn and the risk of prolapsed iris avoided.

P. G. DOYNE.

CONNER (113, **Congenital choroideremia**) in examining the eyes of a soldier who had, all his life, suffered from night blind-

ness found the choroid entirely absent in both eyes except for a small circular area about twice the size of the disk, in the macular region. The fields of vision were markedly contracted for form as well as for colors.

ALLING.

LINDNER (123, **Metastatic ophthalmia**) saw a peculiar case of metastatic ophthalmia which presented clinically with no signs of irritation a deep, striated corneal opacity. The stiæ were straight, thick, some radiating, some crossing. Examination of the eye removed after death revealed streptococci in a network of marginal loops in the episcleral tissue, in the anterior ciliary veins, and in Schlemm's canal, whence they extended in thin lines between the most posterior lamellæ of the cornea to its center. From the filtration angle they extended into the ciliary muscle, along the posterior surface of the cornea, throughout the iris, and then backwards to the surface of the ciliary body. They also occupied almost the entire suprachoroideal space, whence they passed along a nerve into Tenon's space. The vascular system of the choroid and retina was completely free from germs, as was the vitreous, except for a few in its anterior part. There were scarcely any inflammatory symptoms, but there was necrosis of the cornea, of the inner layers of the sclera, except for a small zone free from bacteria about the optic nerve, of the iris, of the superficial portion of the ciliary body, of the outer and middle layers of the choroid, and of small areas in various places. There was no hypopyon because the vessels of the iris were thrombosed. He considers that the striation of the cornea is not to be considered as due to a folding of its posterior limiting membrane, or to fissures of the endothelium, but probably to a purely optical change of the corneal tissue caused by the entrance of a changed aqueous.

LEMBERG (122, **Uveal sarcoma**) analyzes 31 cases of uveal sarcoma which have been observed during the last 30 years in the Giessen clinic. He finds that the affection was almost without exception unilateral, and that it occurs most often in elderly people, reaching its high point in the seventh decade. Of these thirty-one sarcomas, twenty-eight were situated in the choroid, two in the ciliary body, and one in the iris. In five there was a history of injury at some previous time. The only treatment was removal of the eye. Of twenty-five cases, in

which the operations date back more than five years, four have died from unknown diseases, ten have lived more than five years without recurrence and are well, and six have died, one of a tumor of the liver seven years after operation, and one of cancer of the stomach eleven years after. Of the more recent cases one is dead of metastasis in the liver, three are well, and the rest have passed from under observation. Of fourteen cases operated on in the first stage, five are well, another is well at the end of four years, one died from metastasis, two are dead from unknown causes, and nothing is known of the other five. The results in the second stage of the disease are not so good, and in the third stage are still worse.

VELHAGEN (124, **Two choroidal sarcomas in one eye**) found a pigmented round-celled sarcoma at the posterior pole, and a less pigmented spindle-celled one in the equatorial region. They were 5 or 6*mm* apart and the intermediate tissue showed inflammatory changes. He thinks the spindle-celled sarcoma was a metastasis, as the round-celled had the simple construction.

JACKSON (120, **Pseudotumors of the uveal tract**) relates two cases in which the diagnosis of intraocular tumor was in doubt. The eye of a boy of 13 showed a grayish white sharply defined mass projecting into the vitreous from the ciliary region. Questionable transillumination, the presence of synechiæ and the history of an attack of inflammation, pointed rather to uveitis. A year later the mass had become white and shrunken. The other case was a man of 59 who showed in the region of the macula a circular elevated area twice the size of the optic disk. He was given KI and the lesion did not increase in size. Six years later the patient reported that the vision had recently failed.

ALLING.

DENNIS (115, **Apparent sympathetic ophthalmia nine months after enucleation with implantation of gold ball in Tenon's capsule**) removed an eye lost through inflammation following injury by a piece of steel which was extracted with a magnet. At the time the other eye was free from irritation with vision $\frac{2}{3}\frac{0}{0}$.

He implanted a gold ball. Eight months later the patient returned with reduced vision, pericorneal injection, Descemi-

tis, loss of accommodation and slightly elevated tension. Under treatment he recovered but there were two recurrences about a year apart. Since that time (three years) the patient has been free from trouble.

ALLING.

COOKE (114, **Focal infection in sympathetic ophthalmia**) believes that sympathetic ophthalmia is an anaphylactic inflammation. A focal infection such as an apical abscess furnishes the larger doses necessary for anaphylaxis, the eye being already sensitized. With this in mind he urges that a thorough search be made for focal infections in these cases. He relates cases in which infected teeth were discovered and which seem to bear out his contentions.

ALLING.

DOR (116, **A case of sympathetic ophthalmia cured without enucleation**) relates the case of a wounded soldier, who refused to permit enucleation of the injured eye, was treated with atropine, salicylates, and intravenous injections of mercury and recovered with a vision of $\frac{1}{3}$ R. and $\frac{2}{3}$ L.

SCHOENBERG.

Attention has been called to the fact that cases of this disease are often the subjects of constitutional disturbances and it has been suggested that it is an anaphylactic phenomenon. KNAPP (121, **The autotoxic factor in sympathetic ophthalmia**) relates four cases tending to show that toxæmia is associated with the condition. They belonged to the type characterized by a serous iridocyclitis in distinction from the plastic form which is of a more serious nature. There was in the second eye moderate ciliary congestion, posterior corneal opacities, neuroretinitis as well as the macular changes and small choroidal spots at the periphery described by Haab. The treatment was eliminative with subconjunctival injections of salt solution. Two of the eyes causing the sympathy were enucleated and examined. They showed the typical sympathetic infiltration.

ALLING.

XIII.—THE LENS.

125. ASCHER, KARL W. **Smith's extraction of senile cataract in its capsule.** *Klin. Monatsbl. f. Augenheilkunde*, lxiv., 1920.

126. BARRAQUER, I. **Phakerisis.** *Amer. Jour. of Ophthalm.*, October, 1920.

127. BENNETT, A. G. **Immediate capsulotomy in the extraction of senile cataract.** *Ibid.*, December, 1919.

128. GONZALES, J. DE J. **Spontaneous rupture of Morgagnian cataract.** *Ibid.*, October, 1919.

129. FRANÇOIS. **Immediate discission of the posterior capsule in cataract extraction.** *La clinique ophtalmologique*, viii., 5.

130. TERSON, A. **Remarks on preliminary iridectomy and cataract extraction in diabetics.** *Annales d'oculistique*, clvi., 3.

131. ZIEGLER, S. L. **Adventitious membrane following operation for secondary cataract.** *American Journal of Ophthalmology*, April, 1920.

ASCHER (125, **Smith's extraction**) reports the results obtained by Elschnig in 129 operations of this nature, and comes to the conclusion that this procedure is not fitted for European conditions. The advantages claimed are no secondary operation, better vision, no postoperative inflammation, shorter postoperative treatment, and operability of unripe cataracts. The main disadvantage is the danger of loss of vitreous. The results in this series of cases showed no shortening of the convalescence, and no better visual results than after extraction from the capsule.

BARRAQUER (126, **Phakerisis**) describes the suction apparatus which he has devised for the extraction of cataract. The tip is introduced after the corneal section either with or without iridectomy and applied to the anterior capsule where it adheres. By tilting the lens it is brought out through the pupil and wound. He has operated upon 1000 cases by this method. ALLING.

BENNETT (127, **Immediate capsulotomy in the extraction of senile cataract**) recommends that capsulotomy be done by the point of a knife as it passes through the anterior chamber. The point should not be thrust deeply into the lens but just under the capsule, the pupil being widely dilated with atropine before the operation. He does the simple extraction. The advantages are that only one instrument is introduced and a wide opening in the capsule is usually insured giving a clear pupil.

He has had very little trouble with the iris falling in front of the knife. In hypermature cataracts with tough capsules and weak suspensory ligaments he advised opening with the forceps. A table of 26 cases is appended. ALLING.

After the cataract has been extracted FRANÇOIS (129, **Immediate discission of the posterior capsule in cataract operation**) introduces a cystotome into the anterior chamber and makes linear incision into the posterior capsule from the lower margin of the pupil upwards. He thinks the results as to the vision are better and that the procedure obviates a subsequent needling.

SCHOENBERG.

ZIEGLER (131, **Adventitious membrane following operation for secondary cataract**) has observed in a few cases a diminution in vision which he attributes to the formation of a delicate membrane; in the pupillary area. The only sign is a faint iridescent sheen covering the whole surface of the vitreous body. It may appear at any time after the discission. The treatment which he advises is his V-shaped capsulotomy.

ALLING.

TERSON (130, **Remarks on preliminary iridectomy and cataract extraction in diabetics**) says that the general consensus is that in diabetics, cataract extraction is frequently followed by iritis and that preliminary iridectomy is a good measure of preventing total occlusion of the pupil.

SCHOENBERG.

GONZALES (128, **Spontaneous rupture of Morgagnian cataract**) relates the case of a woman 75 who had a cataract removed from one eye about twenty years ago. Nothing was done with the other. Fourteen years after the extraction she was suddenly attacked with acute pain in the unoperated eye. There was marked congestion and rise of tension which subsided under local treatment. He thinks that the cataract was in the Morgagnian stage and the capsule ruptured spontaneously, filling the anterior chamber with albuminous fluid and causing the glaucoma. Since that time the eye has remained quiet and the nucleus has not been absorbed.

ALLING.

XIV.—GLAUCOMA AND INTRAOCULAR TENSION.

132. ELLETT, E. C. **A case of intraocular sarcoma with unusual operative history.** *American Journal of Ophthalmology*, October, 1920.

133. FRANZ. **Hypotonia bulbi with intraocular tumors.** *Klin. Monatsbl. f. Augenheilkunde*, February-March, 1920.

134. GRADLE, H. S. **Cyclodialysis.** *American Journal of Ophthalmology*, January, 1920.

135. KNAPP, A. **Hypotony after trephining.** *Ibid.*, February, 1920.

136. WEEKS, J. E. **Personal observations regarding the treatment of glaucoma.** *Journal A. M. A.*, October 11, 1919.

137. WIEGMANN. **Trephining for glaucoma.** *Klin. Monatsbl. f. Augenheilk.*, lxiv., p. 117.

ELLETT (132, **Intraocular sarcoma with unusual operative history**) did a trephining on an eye with acute glaucoma and a history of failing vision for six months. The following day the wound was filled with a prolapse of retina and vitreous. The eye was then enucleated and found to contain a sarcoma. The case illustrates the fact that a hard blind eye, with the other normal, should be looked upon with suspicion of intraocular tumor. ALLING.

WIEGMANN (137, **Trephining for glaucoma**) suggests the following modification for the formation of the flap. A very thin knife is introduced in the most superficial tissue of the cornea, and a counterpuncture made about 4*mm* distant, and an incision is made so as to include with the corneal a small scleral flap and a larger one of the conjunctiva. After bleeding has been checked the flap is lifted and the trephining done in the usual manner.

KNAPP (135, **Hypotony after trephining**) notes the fact that occasionally hypotony results from too free filtration after trephining, and thinks that, if prolonged, it is capable of producing serious results. The effect desired should be sought by the use of a smaller trephine, rather than by leaving part of the disk. He relates his experience with six eyes in which too low tension persisted for a number of years. One eye developed iridocyclitis, two cataract, and three detachment of the choroid. ALLING.

WEEKS (136, **Treatment of glaucoma**) has performed the trephine operation fifty-eight times, and has had two intraocular hemorrhages, six cases of iritis, two of detachment of the choroid, two of late infection, and a number in which there was a return of the tension. Now he limits the operation to buphthalmos. He has done the Lagrange operation 269 times and relies upon it exclusively.

ALLING.

According to GRADLE (134, **Cyclodialysis**) cyclodialysis should be performed when an eye is free from inflammation. It is successful in about fifty per cent. of the cases. Temporary results are obtained in twenty per cent., but thirty per cent. are failures.

ALLING.

FRANZ (133, **Hypotonia bulbi with intraocular tumors**) reports three cases in which the hypotonia was marked. A tonometric measurement was made in only one case, and in this the tension of the eye containing the tumor was from 6 to 8*mm* below that of the other eye. The tumors were associated with an extensive detachment of the retina in all three cases, and in two the tumor extended to the ciliary body. No anatomical condition was found to explain the occurrence of the hypotonia. In one case the ciliary body was injured by the situation of the tumor, and in all the blood vessels of the choroid, ciliary body and iris were distended. No changes could be demonstrated which pointed toward a diminution of the secretion of aqueous and thereby a reduction of the intraocular tension. In all three the vitreous was shrunken and the filtration angle, as well as Schlemm's canal, was wide open. Possibly the hypotonia may have been due to an increased escape of the aqueous.

XV.—THE RETINA AND VITREOUS.

138. CHANCE, B. **Symmetric macular degeneration in a brother and sister.** *American Journal of Ophthalmology*, April, 1920.

139. DARIER, A. **A case of retinal detachment in a myope cured by puncture of the sclera and subconjunctival injections.** *La clinique ophtalmologique*, viii.

140. DAVIS, A. E. **Recurrent retinal hemorrhage in adolescence.** *American Journal of Ophthalmology*, September, 1920.

141. DE SCHWEINITZ, G. E., and WIENER, M. **1. Cysticercus of the vitreous. 2. Congenital multilocular cysts in relation with the retina. 3. Anterior lenticonus.** *Journal A. M. A.*, October 18, 1919.

142. ELLIOT, R. H. **A study of the results of infection of the vitreous body with septic material in couched eyes.** *British Journal of Ophthalmology*, February, 1919.

143. FERNANDEZ, F. M. **Multiple aneurysms of the retinal arteries.** *American Journal of Ophthalmology*, September, 1920.

144. HAAB. **Studies with the ophthalmoscope.** *Arch. f. Augenheilkunde*, lxxv., p. 113.

145. HEDDE. **Grouped nævoid pigmentation of the retina.** *Klin. Monatsbl. f. Augenheilkunde*, February-March, 1920, p. 301.

146. HESSE. **Prolapse of vitreous into the anterior chamber.** *Zeitschr. f. Augenheilkunde*, xlii., p. 191.

147. HOWARD, H. J. **The origin of the vitreous.** *American Journal of Ophthalmology*, August, 1920.

148. JACKSON, E., and FINNOFF, W. C. **Tuberculosis of the retina.** *Ibid.*, October, 1919.

149. JACKSON, EDWARD. **Thrombosis of retinal veins after influenza.** *Ibid.*, December, 1920.

150. KUSAMA, K. **X-ray treatment of retinal glioma.** *Ibid.*, September, 1919.

151. MIDDLETON, A. B. **Macular hole in the retina.** *Ibid.*, November, 1919.

152. STARGARDT. **A postoperative panophthalmitis by gramnegative micrococci.** *Zeitschr. f. Augenheilkunde*, xlii., p. 227.

153. TERSON, A. **Traumatic detachment of a retinal vein.** *Archives d'ophtalmologie*, xxxvi., 7.

154. TRAQUAIR, H. M. **Hereditary glioma of the retina.** *British Journal of Ophthalmology*, January, 1919.

155. ZENTMAYER, WILLIAM. **Recurrent retinal hemorrhages.** *American Journal of Ophthalmology*, September, 1920.

MIDDLETON (151, **Macular hole in the retina**) out of 100,000 men examined at Camp Travis, found 23 cases of hole in the macula. The holes were as a rule circular but a few were elliptical with the long axis generally horizontal. Four cases were associated with rupture of the choroid. As a rule there was a halo of pigment in the retina about the hole. Small white retinal spots were seen in most of the cases and were probably due to hemorrhages at the time of the injury. In every case the pupil was slightly larger than the other but the author's explanation, that this was due to the macular defect, is hardly sound. In one case only was there no history of injury to the affected eye.

ALLING.

DARIER (139, **Retinal detachment cured by puncture of the sclera and subconjunctival injections**) claims that by this treatment he has cured ten per cent. of the sixty cases he has seen during the past twenty years.

SCHOENBERG.

CHANCE (138, **Symmetric macular degeneration in a brother and sister**) found in the eyes of these two patients a somewhat similar picture in the form of a well-marked circular area of

retinal absorption at the macula. The patches were a little larger than the disk and were surrounded by pigment. The base was formed by the choriocapillaris. The eyes had defective color perception and the fields of vision were contracted. The cases are undoubtedly manifestations of degeneration of the retina and probably not congenital in origin. Syphilis and tuberculosis were both excluded.

ALLING.

DAVIS (140, **Recurrent retinal hemorrhage in adolescence**) studied two cases, both males, in good health with history of tuberculosis in the family and negative as to syphilis and gonorrhœa. Both reacted to the tuberculin test. Each had recurrent hemorrhages, retinitis proliferans, and finally detachment of the retina with loss of vision. Two types are described —one where at first there is a perivasculitis of the retinal veins and the other in which the central veins and optic nerve are involved. The weight of opinion seems to lean toward tuberculosis as the cause of this obscure disease.

ALLING.

ZENTMAYER (155, **Recurrent retinal hemorrhages**) thinks that the thyroid extract is of real value in the treatment of these cases, in view of the variability of the factors in different cases. The absence of definite evidence of tuberculosis, the fairly constant age, that is adolescence, its occurrence in males, the low vitality of the patients, and the beneficial effects of the thyroid treatment, he suggests that the disturbance in the endocrine organs may have bearing on the ætiology of the condition.

ALLING.

FERNANDEZ (143, **Multiple aneurysms of the retinal arteries**) was consulted by a patient 54 years old who for six weeks had noted a marked reduction of vision amounting to $\frac{6}{200}$ in one eye. Along the course of the arteries were numerous aneurisms and small hemorrhages. There were also a number of atrophic patches which evidently were the result of previous hemorrhages. The general arterial tension was 180*mm* with signs of general arteriosclerosis. The patient died 40 days after the examination. While the prognosis for life is poor in the elderly, aneurisms occasionally occur in the young, sometimes due to tuberculosis, and are less serious. ALLING.

The first case described by JACKSON and FINNOFF (148, **Tuberculosis of the retina**), a man of 28, appeared with small areas of infiltration in each cornea accompanied by congestion and irritation. Later perivasculitis of the retinal veins ensued with attacks of hemorrhage and the case, after two and a half years, presented the appearance of retinitis proliferans in the right, although the left cleared soon after the onset. Tuberculin was given more or less regularly. It seemed probable that the infection was with the bovine tubercle bacillus because the patient was known to have drunk tuberculous milk and because there was a marked focal reaction after the injection of bovine tuberculin. The second case showed small grayish white spots radiating from the macula, dilated veins, and small hemorrhages in one eye. Tuberculin was begun and the eye gradually cleared. Evidences of pulmonary tuberculous lesions were also found. The last case gave a history of attacks of retinal hemorrhages which cleared. When first examined he had dense floating opacities in the vitreous and choroidal patches in the left. As the lung apices were infiltrated, he was put upon general treatment. Except for slight vitreous opacities the eyes completely recovered. Retinal tuberculosis begins with white infiltration generally in front of the retinal veins. Later the vessels show perivasculitis with altered caliber. Hemorrhages then appear either in the retina or bursting into the vitreous and may be followed by retinitis proliferans.

White spots appear at the macula in some cases. Case not accompanied by pyrexia or extensive lesions elsewhere, do well under tuberculin.

ALLING.

KUSAMA (150, **X-ray treatment of retinal glioma**) relates his experience in three cases of glioma affecting both eyes treated by X-ray and radium. The treatment resulted in complete disappearance of the growths but also the shrinking of the eyeballs. Unfortunately all three children died very shortly, one from meningitis and the others from metastases. The author concludes that, although the tumors were destroyed in the orbit, the deeper portions may have escaped and being thus stimulated, hastened the formation of extensions and secondary growths. Metastases in glioma occur in the majority of cases in the cranial bones or the brain, occasionally in

the lymphatic glands and rarely in the liver and elsewhere. If the X-ray is applied in sufficient strength and duration it is possible to produce maceration of the lids, necrosis of the cornea, and phthisis bulbi, as in the cases related. Experiments have shown that the ray has a deleterious effect upon the growing eye in the young producing cataract and degeneration.

ALLING.

TRAQUAIR (154, **Hereditary glioma of the retina**) reports three cases of hereditary glioma. The father when six months old had his left eye removed for a tumor, almost certainly glioma, by Argyll-Robertson. Two children were born alive, one stillborn. Both children died from glioma in the eye, consent to operation being refused. Such reports are becoming more frequent, and no one can now question the fact that glioma is a hereditary disease.

T. HARRISON BUTLER.

TERSON (153, **Traumatic detachment of a retinal vein**) describes a case of this nature, which he claims to be the first on record.

SCHOENBERG.

JACKSON (149, **Thrombosis of retinal veins after influenza**) relates two cases which showed the picture of retinal thrombosis and quotes the literature of the subject. Influenza is known at times to cause thrombosis of the large peripheral vessels as well as of the brain. Both of his cases entirely recovered and he thinks the prognosis good.

ALLING.

In HEDDE'S (145, **Grouped nævoid pigmentation of the retina**) case minute points were grouped together into larger spots that presented an appearance like that of lobes of glands, the majority of them in the periphery, leaving the macula free. They were independent of the courses of the vessels. In the upright image they showed a very finely granular appearance, which was looked upon as a characteristic of the pigment epithelium. The patient had also several small nævi on the skin, and Hedde considers the anomaly to have been congenital.

HAAB (144, **Studies with the ophthalmoscope**) discusses the traumatic affections of the macula, of which he distinguishes three forms: (1) those due to contusion; (2) those caused by the presence of a foreign body in the eye; (3) those due to pressure

on the globe from behind. In fresh cases of the first class opacities appear in and about the macula, as well as a little central bright spot, due to a changed foveal reflex, or a substratum behind the retina. He does not think that the opacity of the macula can be explained as due to *contre coup*. The permanent changes come later and consist of markings, often like those seen in myopia, yet the vein-like figures are usually wanting. Changes take place in the pigment epithelium, but it is hard to determine the part taken by the ciliary vessels. It is very rarely that these changes retrogress. Lacerations of the choroid are rare. After removal of a cataract caused by a contusion the macular affection may give a poor result. Such defects may be found after delivery by forceps, when the foveal reflex may be absent, and fine white spots present between the macula and the papilla. In the second class of cases the distant action of bits of iron upon the macula makes itself manifest very soon, although there is no such predilection as when bits of copper are in the eye. The third class of cases is illustrated by one of angioma of the orbit with protrusion of the eye, which he studied anatomically, but examples were frequently seen during the war, caused by shot wounds.

HOWARD (147, **Origin of the vitreous**) examined an eye which was removed for suspected glioma and found a condition of the vitreous which appears to throw light upon its origin. There were found three varieties of vitreous fibers. First ectodermal protoplasmic fibrillæ which represent the first stage of development in the embryonic state. Its use is support for the hyaloid vascular system which begins during the seventh week. Its existence is transitory. The second variety consists of fibers originating from the pars ciliaris retinæ and normally extend through the whole retina disappearing later. Thirdly a connective tissue of mesodermal structure which springs from the cells of the fibro-vascular sheath of the lens and displaces the second.

ALLING.

HESSE (146, **Prolapse of vitreous into the anterior chamber**) reports a number of cases in which a drop of vitreous with a transparent envelope had penetrated between the iris and the lens into the anterior chamber as far as the margin of the pupil. The iris and lens were separated by the prolapse, so that the

depth of the anterior chamber was altered. The wall of the drop of vitreous was stained by blood or pigment. The lens was displaced slightly in all but one case, in which it was dislocated. The cause in one case was a perforating wound, in all but one of the others a contusion, that lacerated the zonula and so allowed the vitreous to enter through the posterior chamber. In one case there was no history of traumatism, but one of high myopia with detachment of the retina and displacement of the lens.

Two days after an operation for detachment of the retina by STARGARDT (152, **Postoperative panophthalmitis by gramnegative micrococci**) evidences of an infection appeared. The fluid taken from the eye showed gramnegative, fairly large diplococci, mostly in leucocytes crammed with the bacteria. The eye had to be exenterated later, and cultures from its contents revealed the same diplococcus. On nutritive media it developed a very luxuriant growth in the form of a whitish gray coating. This microörganism is distinctly different from the gramnegative micrococci that have been described hitherto, and belongs to the bacteria of the gonococcus and meningococcus group, which contains a large number of nearly related forms. Whence the microörganisms came could not be determined.

Not the least interesting feature of Colonel ELLIOT's (142, **A study of the results of infection of the vitreous body with septic material in couched eyes**) paper is the three pages of photographs of the sectional globe. These are the work of Mrs. R. H. Elliot, and rank with the very best result of professional work.

In 1911 the late Professor Straub of Amsterdam read a paper to the Ophthalmological Society upon the pathology of certain opacities which develop in the vitreous when the ciliary body has been deliberately infected with tubercle bacilli. He found that: The optic nerve head became inflamed. In the vitreous were found a number of leucocytes, seated upon thin membranes, lying upon the granuloma which had developed in the vitreous and the inflamed optic disk. Aggregations of leucocytes were found upon the walls of the cavities of the eye, on the cornea, the lens capsule, the retina, and in cavities of the vitreous. Straub argued from these findings that the current of the

lymph in the vitreous goes by the optic nerve, and he inferred that in cyclitis a slight haziness of the retina and some optic neuritis must be expected.

When Elliot began to examine eyes which had been removed at Madras after unsuccessful couching, the first feature noted was the frequency of changes in the vitreous. Colonel Kirkpatrick has commented upon the fact that the vitreous in these eyes is shrunken, a clear space is left occupied by aqueous.

Elliot has examined 54 globes removed after couching operations. He concludes that the changes found do not support Straub's view that there is a clinical entity "hyalitis." The important element is septic infection of the ciliary body, the retina, and the choroid. There was no evidence that localized cultures of organisms were present in the vitreous, on the contrary the virus is evenly distributed through the vitreous. It appears that these organisms cause chemotactic action and that the brunt of the assault falls upon the retina. The appearances found suggest that some at least of the lymph from the eye takes a backward passage and escapes by channels in or near the optic nerve. T. HARRISON BUTLER.

DE SCHWEINITZ and WIENER (141, 1. **Cysticercus of the vitreous. 2. Congenital multilocular cysts in relation with the retina. 3. Anterior lenticonus**) discovered a cysticercus in a blind eye and attempted to remove it through an incision in the sclera but the forceps ruptured the cyst and nothing could be brought away. The eye was enucleated later on account of inflammation. 2. There was a large transparent balloon-like cyst protruding from an atrophic area near the macula. From this there extended a tube which ended in a widespreading cystic mass covered with vesicles and blood vessels. 3. Each lens which was small and slightly hazy presented a pronounced cone with the tip almost touching the posterior surface of the cornea.

ALLING.

XVI.—ACCIDENTS, INJURIES, FOREIGN BODIES, PARASITES.

156. CLAPP, C. A. **Removal of steel from the eye from an industrial standpoint.** *American Journal of Ophthalmology*, May, 1920.

157. DE LA PERSONNE, F. **Results of early treatment of wounds of the orbit and eye.** *Archives d'ophtalmologie*, xxxvi., 7.

158. DE SCHWEINITZ, G. E. **Concerning concussion and contusion injuries of the eye in warfare.** *American Jour. of Ophthalmology*, May, 1919.

159. DOR, L. **Traumatic hemeralopia.** *Clinique ophtalmol.*, viii., 2.

160. DOR, L. **The technic of extracting nonmagnetic foreign bodies from the vitreous.** *Ibid.*, viii., 3.

161. GIFFORD, H. **Rupture of cornea by contrecoup from bullet wound of the orbit.** *American Journal of Ophthalmology*, November, 1920.

162. HOLMES, GORDON. **Disturbances of visual orientation.** *British Journal of Ophthalmology*, September, 1920.

163. KRAUSS. **Ophthalmo-surgical experiences in wounds of the skull during the war.** *Klin. Monatsbl. f. Augenheilkunde*, February-March, 1920, p. 194.

164. MOHR. **Rupture of the optic nerve by contusion.** *Ibid.*, p. 310.

165. MORAX, MOREAU, and CASTELAIN. **The various types of macular vision disturbances after traumatic lesions of the occipital region.** *Annales d'oculistique*, clvi., 3.

166. MOREAU, F. **Pseudosyndrome alternans.** *Ibid.*, clvi., 3.

167. PERRIN, R. **Keratitis due to melinite.** *Ibid.*, clvi., 3.

168. SHOEMAKER, W. T. **Penetrating and perforating wounds of the eyeball and treatment of retained foreign bodies.** *American Journal of Ophthalmology*, August, 1919.

169. UHTHOFF, C. A. **Four cases of cysticercus subretinalis in soldiers.** *Klin. Monatsbl. f. Augenheilkunde*, February-March, 1920, p. 180.

170. WIEGMANN. **Two cases of injury of optic nerve with unusual course after trauma to the skull.**

171. YOSHIDA, Y. **Wasp-sting, with special color changes in the iris.** *American Journal of Ophthalmology*, July, 1920.

Disturbances of visual orientation, meaning thereby an affection of the power of localizing the position in space and the distance of the objects by sight alone, are among the rarer conditions due to cerebral lesions met with in civil practice. Six cases of perforating gunshot injuries of the head in young healthy adults, in which this condition was present, form the basis for HOLMES's (162, **Disturbances of visual orientation**) paper. These cases are exhaustively recorded and are illustrated with diagrams of the situations of the wounds and charts of the fields of vision.

The symptoms can be divided into two groups; the first includes the disturbance of orientation and localization in space by sight, the inability to estimate absolute and relative distances, and the failure to recognize relative lengths and sizes; while in the second group can be placed together the disturbances of the movements of the eyes and ocular reflexes, that is,

the difficulty in fixing objects seen and in keeping the eyes fixed on them when they are moved, the failure to converge on and accommodate for near objects, and the absence of the blinking reflex.

Holmes emphasizes the fact that the symptoms presented by these cases cannot be attributed to defects of visual perception, as in four of the cases the central vision was normal or approximately so and in the remaining two it was certainly moderately good, although it was not possible to measure it accurately. In all the cases there were some defects in the visual fields, but the visual loss never approached the central zone and it is a fact that the spatial orientation of objects seen is not influenced by the presence of hemianopia or other large losses in the fields of vision, whether they be due to cortical, subcortical, or tract lesions.

The affection of visual orientation was obvious in several tests; the patients were unable to touch accurately any objects within their reach and vision, though the movements of the arms were intact; in walking they collided with easily visible objects and had difficulty in finding their way around them; often they could not easily recognize the relative positions of two similar objects in space; in attempting to touch an object they made mistakes in all three planes of space, that is in judging its lateral and vertical position as well as its distance. Holmes, in discussing these symptoms, compares retinal sensibility to cutaneous sensibility and points out that in certain cerebral lesions the locality of a tactile stimulus can no longer be recognized, though there may be no affection of either the threshold of sensibility or of the quality of the sensations evoked.

In all the cases it was in the estimation of distance that the greatest disorder of function was seen; distances were usually overestimated, showing defect in the proprioceptive impulses from the ocular muscles, especially on those excited by convergence and accommodation.

A striking symptom in five of the cases was the difficulty they experienced in finding their way about in new surroundings or in those in which they were not especially familiar. It would appear probable that in these cases the cerebral mechanisms, by which the spatial percepts received through the differ-

ent senses are associated and assimilated with past experiences, were involved.

Other striking symptoms were the inability to explore a limited surface properly with the eyes, and to enumerate conspicuous objects on it; the relative positions of words in the page were not recognized promptly and were not brought in proper succession into central vision; the failure to observe portions of surfaces in front of their eyes (though falling on functionating portions of the retina).

Stereoscopic vision appeared to be intact in all the cases. With regard to the more purely ocular symptoms, disturbance of fixation was the most prominent of these; the patient when asked to look at an object would roll his eyes about until he found, as if by chance, the object sought. This impairment of fixation would naturally result from defective spatial orientation, as when the position of the object, which throws its image on the retinæ, is not properly appreciated, the eyeballs cannot be rotated so as to carry the exciting image to the macula.

Now, as in all these cases the wounds involved the region of the angular gyrus, it might be suggested that it was to the absence of accurate fixation and accommodation that the disturbance of visual orientation was wholly due; Holmes however points out that normal persons can locate with far greater accuracy than those patients the position in space of objects when their images fall only on extramacular portions of the retina, and further in a man in whom a midbrain and pontine tumor had abolished all ocular movements and accommodation the power of localization was far superior.

The act of blinking was abolished in five of these patients. Blinking therefore seems to be a forebrain reflex dependent on the functions of the centers which were injured in these cases, although an alternative suggestion could be offered that the absence of the reflex may be due to disturbance of perception of the distance of the threatening object. With regard to the anatomical positions of the lesions, in the first place in all six cases both hemispheres of the brain were injured by perforating missiles; in the second place the available anatomical facts indicate that in all cases the lesions on the lateral surfaces of the hemispheres lay within a zone which included in its center the angular and supramarginal gyri, and extended into the

adjoining occipital, temporal, and parietal convolutions. The structures injured by the passage of the missiles are more uncertain, but the wounds on the mesial surfaces of the hemispheres probably all lay in the region of the splenium. Probably also the upper fibers of the optic radiations were involved.

P. G. DOYNE.

YOSHIDA (171, **Wasp-sting, with special color changes in the iris**) saw his case about one month after the eye was stung by a wasp. There was swelling of the lids and some injection of the bulbar conjunctiva. The cornea showed in its entire extent a diffuse grayish opacity most marked in the center, which under the loupe was seen to be made up of numerous fine dots. The surface was roughened and presented in its center a few vesicles. The pupil was wide and fixed. The most striking change was in the iris which showed a bluish discoloration and blurred markings. There were also a few opacities in the lens. An optical iridectomy was done later and the specimen examined. The anterior limiting membrane was found altogether wanting so that the vascular layer was laid bare and to this is attributed its peculiar color.

ALLING.

DE SCHWEINITZ (158, **Concussion and contusion injuries of the eye in warfare**) discusses broadly the general and peculiar characters of war injuries of the eye. As special types of concussion and contusion injuries, compared with those met with in civil practice, may be mentioned cases without perforation showing reduced intraocular tension—commotio retinæ with more numerous hemorrhages, a yellow retinal haze and of a longer duration—chorioretinitis proliferans generally with rupture of the membranes and a cicatricial process leading to pinning down of the retina rather than to detachment.

ALLING.

DOR (159, **Traumatic hemeralopia**) describes the sixth case of this nature he has seen. The patient, an army officer twenty-five years of age, remained for twenty-three days in a state of coma, after a fall on his head. Convalescence was protracted and when he returned to his duties, six months later, he noticed that he could not see at night. When examined by the author ten months after the accident, his vision and fundus were found normal, but the fields for yellow and

blue were markedly contracted. The fact that the patient had fulfilled the duties of an army officer for three years preceding the accident excludes the possibility of a congenital hemeralopia.

SCHOENBERG.

DOR (160, **The technic of extracting nonmagnetic foreign bodies from the vitreous**) advises the use of a special forceps having two small spoons at the end, which spoons can be approached and separated by sliding a tube up or down the opposite end of the forceps. After the incision is made in the eyeball, in the region of the equator, the forceps is introduced as soon as the knife is removed, so that no vitreous should be lost. With the aid of a head mirror, strongly illuminated, light is thrown into the interior of the eye and the end of the forceps are opened; the foreign body caught between the spoons, the forceps is closed again and the body is extracted. By this method the author has succeeded in extracting two pieces of copper from the same eye, one 1*mm*, the other ½*mm* in size.

SCHOENBERG.

CLAPP (156, **Removal of steel from the eye from an industrial standpoint**) reports a series of 49 cases with the following results: Four cases retained normal vision, six aphakic eyes had vision from $\frac{2}{60}$ to $\frac{2}{6}$; 10 had useful vision, 7 light perception and 11 were lost, 7 were operated upon by the posterior route.

ALLING.

GIFFORD (161, **Rupture of cornea by contrecoup**) relates three cases in which a bullet passed through the orbit and a rupture of the cornea occurred. He experimented upon sheep and dogs but found in only two eyes a reproduction of the condition. He thinks that the rupture is not due to the entrance of gas from the explosion nor to explosive effects in the orbital tissue but to contusion of the posterior pole of the globe and the transmission of the force to the anterior pole by contrecoup.

ALLING.

Of the 218 cases of shot wound of the head operated on by KRAUSS (163, **Ophthalmo-surgical experiences in wounds of the skull**) the bones of the skull were not injured in 110, and were more or less badly broken up in 108. The optic papilla

was affected in 14 of the first group, ten with choked disk, four with papillitis. Operative measures, in the form of lumbar puncture, were required in three cases, all of which recovered. All of the cases in the second group had to be operated on as quickly as possible. Only 45 of the 108 exhibited permanently normal conditions of the papilla. There were 14 cases of choked disk, 41 of papillitis; the former usually with uninjured, the latter always with injured dura. Almost a third of the second group died within twelve days, mostly from purulent encephalitis or meningitis. Krauss believes that after every penetrating wound of the skull the patient should be kept under ophthalmological observation for at least two weeks. Swelling of the papilla two or three days after the injury he considers a symptom of a complication, and to be of unfavorable prognostic import while papillary signs appearing later he thinks distinctly threatening. Every shot wound of the skull should be looked upon as infected, and surgical measures should be taken from this point of view, to do away with the primary infection and prevent a secondary.

WIEGMANN'S (170, **Two cases of injury to the optic nerve with unusual course after trauma to the skull**) first case was that of a man 56 years old who was struck on the left side of his head. The blow rendered him unconscious for a short time, but there were no symptoms of fracture of the bones, or of the base of the skull. On the day of the accident he had only obscurations and a feeling of weight in his head, but the next morning he was totally blind. After a transient return of light perception he again became totally blind at the end of three weeks. At the same time the papillæ became pale. Wiegmann thinks that in this case there was a bilateral crushing of the optic nerves in the optic canals which did not destroy the nerve fibers immediately, but occasioned a total degeneration. The second case was one of penetrating shot wound of the skull. A year and a half after the injury the vision of both eyes became reduced to counting fingers at a meter, with a bilateral central absolute scotoma, the peripheral portions of the fields remaining normal. The condition remained thus for a year. Then the vision was about half the normal, the right papilla showed a trace of paleness, and there was still a small relative central scotoma in the left eye. The track of the shot

could be traced in the roentgenogram from the posterior bony root of the nose to the neighborhood of the sella turcica.

MOREAU (166, **Pseudosyndrome alternans**) relates on a case of a fracture of the skull in a patient 47 years of age who exhibited on the left side, hemiplegia; on the right side, facial paresis, moderate ptosis, exophthalmus and immobility of the eyeball with a dilated immobile pupil. Hemorrhages on and around the optic disk. Vision equals 0—. Anæsthesia corresponding to the area supplied by the three branches of the right fifth nerve. This condition, called by the author *pseudosyndrome alternans* gradually cleared up almost completely during the following few months. The mydriasis gave place to a myosis and the vision remained nil. The author thinks he has had to deal with a subdural hæmatoma on the right side, extending into the sheath of the right optic nerve. All the symptoms were referable to the pressure caused by the hæmatoma and disappeared soon after this was resorbed.

SCHOENBERG.

The most important lesson taught by the experience with war wounds of the orbit and eyes is to operate as early as possible, to be as conservative as possible, and to suture the wound immediately. DE LA PERSONNE'S (157, **Results of early treatment of wounds of the orbit and eye**) experience embraces 2449 cases with 83 operations. Most of the operations were done under local anæsthesia. Primary union was obtained in cases operated on less than forty-eight hours after the injury.

SCHOENBERG.

MORAX, MOREAU, and CASTELAIN (165, **The various types of macular vision disturbances after traumatic lesions of the occipital region**) have had the opportunity of studying 86 cases of macular vision disturbances following occipital wounds. They classify these disturbances as follows: (1) Typical homonymous hemianopsia; (2) homonymous sector hemianopsia, involving a quarter, at the most, 15 degrees at least of the field of vision of each eye; (3) homonymous scotoma, occupying only a portion of the lateral sectors. A bilateral lesion may give a combination of two of the above types and result in (4) homonymous hemianopsia plus scotoma hemianopsia on the opposite type; (5) double scotoma hemianopsia; (6) homonymous hemianopsia plus central scotomas; finally (7)

complete blindness from total destruction of both visual centers.

The cases of typical homonymous hemianopsia may have the macula spared. They do not complain of any visual disturbance and are only discovered by a routine perimetric examination. The authors have seen 20 such cases. Their acuity of vision, the stereoscopic as well as the diploscopic vision, was not affected. The hemianopsia approaches within five to six degrees from the point of fixation. Other cases (8) have the macula involved and the blind field approaches the point of fixation within 1 to 1½ degrees. The acuity of vision, stereoscopic and diploscopic vision, are usually normal. The lesion is to be found in the occipital lobe opposite to the field defects. The cases of sector homonymous hemianopsia (15 cases) show a more or less triangular defect with the apex of the triangle very near the fixation point. The inferior variety is the most frequent one. In 8 cases the sector extended as far as one degree towards the fixation point. The acuity of vision, the diploscopic and stereoscopic vision, were normal.

The cases of hemianopic scotomas showed several varieties: (a) The median type, consisting of a scotoma extending 5 to 20 degrees from the median line of the field and about as much above and below the horizontal meridian; (b) the sector type, triangular in shape, and always occupying a space between the horizontal and vertical meridian; (c) inferior hemianopsia, consisting of a bilateral hemianopic scotoma.

The acuity of vision was normal. The stereoscopic fusion was abnormal in 4 out of 20 cases.

The cases of homonymous hemianopsia associated with hemianopic scotoma on the opposite side are caused by lesions of both occipital lobes. The macular field is involved in some cases and almost always on the same side as the total hemianopsia. The authors saw 14 such cases, 10 of which had an involvement of the macular field (that is the blind field extended within one degree from the fixation point).

Cases of bilateral hemianopic scotomas are rare. These scotomas may be of the median type or they may be both in the lower part of the field.

Cases of homonymous hemianopsia with central scotomas

were few and are due to lesions in the median region of the occiput.

Finally a severe trauma may destroy completely both occipital lobes and cause total blindness.

In all the cases the lesion was to be localized in the occipital lobe opposite to the visual field defects. SCHOENBERG.

Four days after the patient had received a severe blow on the eye MOHR (164, **Rupture of the optic nerve by contusion**) observed in the place of the papilla a very deep, abrupt excavation with no visible vessels. A whitish zone surrounded the hole. There were a number of little hemorrhages in the retina. A small fissure of the base of the orbit could be demonstrated roentgenologically, but there was no movement of the fractured part upon each other, and no pain. In consequence of the absence of the hemorrhages into the vitreous which usually complicate cases of this nature, a good ophthalmoscopic study of the condition was possible from the first. The nerve fibers seemed to have ruptured at the lamina cribrosa, leaving the sheath intact. The tension of the eyeball was not materially lowered.

SHOEMAKER (168, **Penetrating and perforating wounds of the eyeball and treatment of retained foreign bodies**) thinks that enucleation during panophthalmitis is a fairly safe procedure although he has seen one case of suppurative meningitis following the operation. In the treatment of crude injuries, common in war, he advocates the use of dichloramine T. in eucalyptol, freely used in packing and sprayed in the wounds. Magnetic bodies in the vitreous should be removed through the sclera, preferably with a small magnet. Nonmagnetic bodies in the vitreous generally demand enucleation but the danger of sympathetic ophthalmia, if the foreign body is sterile, is slight and occurs only from infection through the wound. Regarding the indications in threatened sympathy, prolonged cyclitis or uveitis, a gradual lowering of intraocular tension with failure of vision or photophobia and sympathetic irritation in the other eye are three conditions, any one of which demands enucleation. ALLING.

PERRIN (167, **Keratitis due to melinite**) has seen thirty-two cases. These were in soldiers who had been exposed to fumes

of melinite; all presented a characteristic clinical picture, consisting of first, gradual, and marked diminution of vision; second, a peculiar milky superficial, subepithelial opacification of the lower portion of the cornea, triangular in shape, with the base upwards; third, the presence of a rainbow colored halo when the patient was looking to a light. The keratitis appeared usually some six to ten months after the patient's continuous exposure to the melinite vapors. Recovery after a stay in the hospital of from six to nine weeks.

SCHOENBERG.

In two of the cases reported by UHTHOFF (169, **Four cases of cysticercus subretinalis**) the wall of the sac was distinctly iridescent as seen with the ophthalmoscope, the situation was in the equatorial region, and the anatomical picture after extraction revealed nothing special. In the third case operation was rendered very difficult by the situation in the macula and the presence of a strong connective tissue capsule. The capsule formation had taken place in the course of five months, and was possibly due to cicatrization. Ophthalmoscopically the case was marked by the good visibility of the morphological characteristics, anatomically by the great new formation of connective tissue and the high degree of degeneration of the parts of the retina adjoining the parasite. In the fourth case the cysticercus was parapapillar, operation was not considered practicable, and the eye remained unirritated for a long time. In none of the cases was there tænia solium of the intestines, cysticercus in the brain or the skin that was recognized, and there was no eosinophilia. Internal treatment was ineffective.